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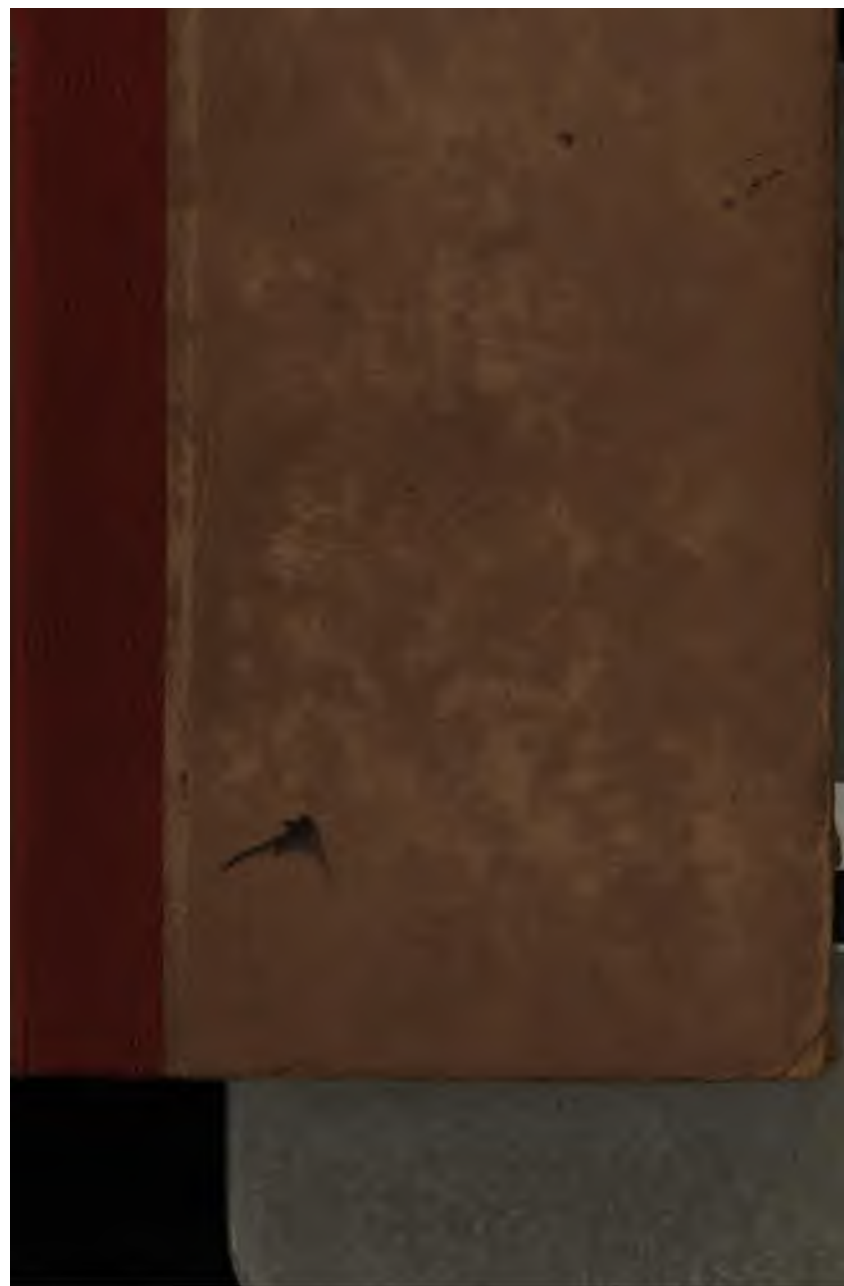
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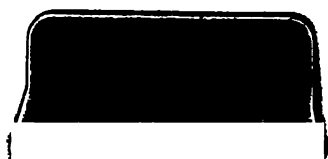
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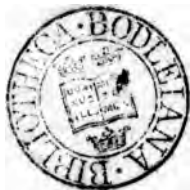
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# SOLUTIONS

TO

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(15)  $712436 \times 24$

$$\begin{array}{r} 12 \\ 8549232 \\ 2 \\ \hline 17098464 \text{ Ans.} \end{array}$$

(16)  $543817 \times 27$

$$\begin{array}{r} 9 \\ 4894353 \\ 3 \\ \hline 14683059 \text{ Ans.} \end{array}$$

(17)  $593654 \times 30$

$$\begin{array}{r} 30 \\ 17809620 \text{ Ans.} \end{array}$$

(18)  $697128 \times 36$

$$\begin{array}{r} 6 \\ 4182768 \\ 6 \\ \hline 25096608 \text{ Ans.} \end{array}$$

(19)  $765438 \times 40$

$$\begin{array}{r} 40 \\ 30617520 \text{ Ans.} \end{array}$$

(20)  $596437 \times 45$

$$\begin{array}{r} 9 \\ 5367933 \\ 5 \\ \hline 26839665 \text{ Ans.} \end{array}$$

(21)  $642198 \times 60$

$$\begin{array}{r} 60 \\ 38531880 \text{ Ans.} \end{array}$$

(22)  $756328 \times 72$

$$\begin{array}{r} 9 \\ 6806952 \\ 8 \\ \hline 54455616 \text{ Ans.} \end{array}$$

(23)  $814765 \times 84$

$$\begin{array}{r} 12 \\ 9777180 \\ 7 \\ \hline 68440260 \text{ Ans.} \end{array}$$

(24)  $913748 \times 96$

$$\begin{array}{r} 12 \\ 10964976 \\ 8 \\ \hline 87719808 \text{ Ans.} \end{array}$$

(Otherwise)  $913748 \times (100 - 4)$   
 subtract  $3654992 = \text{prod. by } 4$   
 $87719808 \text{ Ans.}$

(25)  $234915$

$$\begin{array}{r} 123 \\ 704745 \\ 2818980 \\ \hline 28894545 \text{ Ans.} \end{array}$$

(26)  $704745$

$$\begin{array}{r} 615 \\ 3523725 \\ 704745 \\ \hline 4228470 \\ 433418175 \text{ Ans.} \end{array}$$

(27)  $469830$

$$\begin{array}{r} 369 \\ 4228470 \times 40 \\ 169138800 = 360 \text{ times.} \\ \hline 173367270 \text{ Ans.} \end{array}$$

(28)  $391525$

$$\begin{array}{r} 861 \\ 391525 \\ 2349150 \\ 3132200 \\ \hline 337103025 \text{ Ans.} \end{array}$$

(29)  $1174575$

$$\begin{array}{r} 2214^* \\ 4698300 \\ 1174575 \\ 2349150 \\ \hline 2349150 \\ 2600509050 \text{ Ans.} \end{array}$$

(30)  $3523725$

$$\begin{array}{r} 2583^* \\ 10571175 \\ 28189800 \\ 17618625 \\ 7047450 \\ \hline 9101781675 \text{ Ans.} \end{array}$$

\* Abridgments similar to that in Ex. 27 may be used in Exs. 29, 30, 31, 32, and 35. Thus in Ex. 29, we may take first 2 thous. times, then 2 hund. times, then  $2 \times 7$  times as here shown; and an exactly similar form may be used in Exs. 31 and 32. In Ex. 30 the multiplier is  $= 2400 + 180 + 3$ , and therefore allows us to take 3, 60 times 3, and 800 times 3. In Ex. 35, we may proceed from left to right, taking 7, 8, and 12 times 8.

$$\begin{array}{r} 1174575 \\ 2214 \\ \hline 2349150 \\ 2349150 \times 7 \\ \hline 16444050 \\ 2600509050 \end{array}$$

## SIMPLE DIVISION.

8

$$\begin{array}{r}
 (31) \ 1644405 \\
 \underline{7749^*} \\
 14799645 \\
 \underline{6577620} \\
 11510835 \\
 \underline{11510835} \\
 12742494345 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (32) \ 231549 \\
 \underline{8856^*} \\
 1389294 \\
 \underline{1157745} \\
 1852392 \\
 \underline{1852392} \\
 2050597944 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (33) \ 463098 \\
 \underline{7380} \\
 37047840 \\
 \underline{1389294} \\
 3241686 \\
 \underline{3417663240} \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (34) \ 1389294 \\
 \underline{8900} \\
 1250364600 \\
 \underline{11114352} \\
 12364716600 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (35) \ 926196 \\
 \underline{7896^*} \\
 5557176 \\
 \underline{8335764} \\
 7409568 \\
 \underline{6483372} \\
 7313243616 \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 (36) \ 2778588 \\
 \underline{9867} \\
 19450116 \\
 \underline{16671528} \\
 22228704 \\
 \underline{25007292} \\
 27416327796 \text{ Ans.}
 \end{array}$$

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(INTRODUCTORY PAGES, p. 9.)

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\* See note on preceding page.

(25)  $23)3765897(163734\frac{15}{23}$  *Ans.*

$$\begin{array}{r}
 23 \\
 \overline{146} \\
 138 \\
 \overline{85} \\
 69 \\
 \overline{168} \\
 161 \\
 \overline{79} \\
 69 \\
 \overline{107} \\
 92 \\
 \overline{15}
 \end{array}$$

(26)  $37)4613578(124691\frac{11}{37}$  *Ans.*

$$\begin{array}{r}
 37 \\
 \overline{91} \\
 74 \\
 \overline{173} \\
 148 \\
 \overline{255} \\
 222 \\
 \overline{337} \\
 333 \\
 \overline{48} \\
 37 \\
 \overline{11}
 \end{array}$$

(27)  $41)5128495(124963\frac{12}{41}$  *Ans.*

$$\begin{array}{r}
 41 \\
 \overline{102} \\
 82 \\
 \overline{203} \\
 164 \\
 \overline{394} \\
 369 \\
 \overline{259} \\
 246 \\
 \overline{135} \\
 123 \\
 \overline{12}
 \end{array}$$

(28)  $47)3954371(84135\frac{26}{47}$  *Ans.*

$$\begin{array}{r}
 376 \\
 \overline{194} \\
 188 \\
 \overline{63} \\
 47 \\
 \overline{167} \\
 141 \\
 \overline{261} \\
 235 \\
 \overline{26}
 \end{array}$$

(29)  $234)3755123(16047\frac{125}{234}$  *Ans.*

$$\begin{array}{r}
 234 \\
 \overline{1415} \\
 1404 \\
 \overline{1112} \\
 936 \\
 \overline{1763} \\
 1638 \\
 \overline{125}
 \end{array}$$

(30)  $34,0)576412,3(16953\frac{103}{340}$  *Ans.*

$$\begin{array}{r}
 34 \\
 \overline{236} \\
 204 \\
 \overline{324} \\
 306 \\
 \overline{181} \\
 170 \\
 \overline{112} \\
 102 \\
 \overline{103}
 \end{array}$$

$$(31) 357)34568135(96829\frac{183}{557} \text{ Ans.} \quad (32) 543)76549139(140974\frac{257}{543} \text{ Ans.}$$

$$\begin{array}{r} 3213 \\ 2438 \\ 2142 \\ \hline 2961 \\ 2856 \\ \hline 1053 \\ 714 \\ \hline 3395 \\ 3213 \\ \hline 182 \\ \hline \end{array}$$

$$\begin{array}{r} 543 \\ 2224 \\ 2172 \\ \hline 5291 \\ 4887 \\ \hline 4043 \\ 3801 \\ \hline 2429 \\ 2172 \\ \hline 257 \\ \hline \end{array}$$

$$(33) 693,0)2987653,3(4311\frac{1203}{6930} \text{ Ans.} \quad (34) 7323)56854327(7763\frac{5878}{7323} \text{ Ans.}$$

$$\begin{array}{r} 2772 \\ 2156 \\ 2079 \\ \hline 775 \\ 693 \\ \hline 823 \\ 693 \\ \hline 1303 \\ \hline \end{array}$$

$$\begin{array}{r} 51261 \\ 55933 \\ 51261 \\ \hline 46722 \\ 43938 \\ \hline 27847 \\ 21969 \\ \hline 5878 \\ \hline \end{array}$$

$$(35) 879,0)9564237,1(10880\frac{7171}{8790} \text{ Ans.}$$

$$\begin{array}{r} 879 \\ 7742 \\ 7032 \\ \hline 7103 \\ 7032 \\ \hline 7171 \\ \hline \end{array}$$

$$(36) 9879)34568795(3499\frac{2174}{9879} \text{ Ans.}$$

$$\begin{array}{r} 29637 \\ 49317 \\ 39516 \\ \hline 98019 \\ 88911 \\ \hline 91085 \\ 88911 \\ \hline 2174 \\ \hline \end{array}$$

## CHAPTER I

## Ex. 1. (p. 12.)

- (1)  $\pounds 513 \times 20 \times 12 \times 4 = 492480$  f. *Ans.*  
 $320$  guin.  $\times 42$  sixp.  $\times 12$  hf. d.  $= 161280$  hf. d. *Ans.*
- (2)  $\pounds 2000 \times 8$  hf. crs.  $= 16000$  hf. crs. *Ans.*  
 $2000$  guin.  $\times 42$  sixp.  $= 84000$  sixp. *Ans.*
- (3)  $\pounds 27$  10s.      17s.  $6\frac{1}{2}$ d.      (4)  $\pounds 75$  21 sixp.      220 crs.  
 $\begin{array}{r} 20 \\ 550 \text{ s.} \\ 12 \\ \hline 6600 \text{ d.} \end{array}$  *Ans.*       $\begin{array}{r} 12 \\ 210 \text{ s.} \\ 4 \\ \hline 842 \text{ f.} \end{array}$  *Ans.*       $\begin{array}{r} 40 \\ \hline 3021 \text{ sixp.} \end{array}$        $\begin{array}{r} 5 \\ 1100 \text{ s.} \\ 3 \\ \hline 3300 \text{ fo. d.} \end{array}$
- (5)  $\pounds 47$  10s.  $11\frac{3}{4}$ d.      (6)  $\pounds 29$  10s.  $0\frac{1}{2}$ d.      (7) 23 t.  
 $\begin{array}{r} 20 \\ 950 \text{ s.} \\ 12 \\ \hline 11411 \text{ d.} \\ 4 \\ \hline 45647 \text{ f.} \end{array}$  *Ans.*       $\begin{array}{r} 20 \\ 590 \text{ s.} \\ 12 \\ \hline 7080 \text{ d.} \\ 2 \\ \hline 14161 \text{ hf. d.} \end{array}$  *Ans.*       $\begin{array}{r} 20 \\ 460 \text{ cwt.} \\ 112 \\ \hline 5520 \\ 460 \\ \hline 51520 \text{ lbs.} \end{array}$  *Ans.*
- $\begin{array}{r} \pounds 85 \text{ 0s. } 10\frac{1}{2}\text{d.} \\ 20 \\ 1700 \text{ s.} \\ 12 \\ \hline 20410 \text{ d.} \\ 2 \\ \hline 40821 \text{ hf. d.} \end{array}$  *Ans.*       $\begin{array}{r} 1373 \text{ hf. crs.} \\ 30 \\ 41190 \text{ d.} \\ 4 \\ \hline 164760 \text{ f.} \end{array}$  *Ans.*       $\begin{array}{r} 115 \text{ cwt.} \\ 112 \\ 1380 \\ 115 \\ \hline 12880 \text{ lbs.} \\ 16 \\ \hline 206080 \text{ oz.} \end{array}$  *Ans.*
- (8) 27 lbs.  $\times 16$  oz.  $\times 16$  drs.  $= 6912$  drs. *Ans.*  
11 t.  $\times 20$  cwt.  $\times 112$  lbs.  $\times 16$  oz.  $= 394240$  oz. *Ans.*
- (9) 3 qrs. 14 oz.      47 cwt. 25 lbs.  
 $\begin{array}{r} 28 \\ 84 \text{ lbs.} \\ 16 \\ \hline 1358 \text{ oz.} \end{array}$   $\times 16$  drs.  $= 21728$  drs. *Ans.*       $\begin{array}{r} 112 \\ 564 \\ 4725 \\ \hline 5289 \text{ lb.} \end{array}$   $\times 16$  oz.  $= 84624$  oz. *Ans.*

- (10) 34 cwt. 3 qrs. 11 oz. (11) 4 t. 15 cwt. 2 qrs. 12 lbs. (12) 15 cwt. 2 lbs. 9 oz.

<u>4</u>	<u>20</u>	<u>112</u>
139 qrs.	95 cwt.	1682 lbs.
<u>28</u>	<u>4</u>	<u>16</u>
3892 lbs.	382 qrs.	26921 oz. <i>Ans.</i>
<u>16</u>	<u>28</u>	
62283 oz.	10708 lbs. <i>Ans.</i>	3 t. 3 qrs. 3 oz.
<u>16</u>		<u>80</u>
996528 drs. <i>Ans.</i>	14 cwt. 1 qr. 8 drs.	243 qrs.
	<u>4</u>	<u>28</u>
2 t. 3 qrs. 5 oz.	57 qrs.	1944
<u>80</u>	<u>28</u>	<u>486</u>
163 qrs.	1596 lbs.	6804 lbs.
<u>28</u>	<u>16</u>	<u>16</u>
4564 lbs.	25536 oz.	108867 oz.
<u>16</u>	<u>16</u>	<u>16</u>
73029 oz. <i>Ans.</i>	408584 drs. <i>Ans.</i>	1741872 drs. <i>Ans.</i>

- (13) 16 lbs. Tr.  $\times$  12 oz.  $\times$  20 dwt.  $\times$  24 grs. = 92160 grs. *Ans.*  
 105 lbs. Tr.  $\times$  12 oz.  $\times$  20 dwt. = 25200 dwt. *Ans.*

(14) 27 oz. 10 dwt.	(15) 9 oz. 17 dwt. 22 grs.	(16) 7 oz. 19 dwt.
<u>20</u>	<u>20</u>	<u>20</u>
550 dwt.	197 dwt.	159 dwt.
<u>24</u>	<u>24</u>	<u>24</u>
2200	4750 grs. <i>Ans.</i>	3816 grs. <i>Ans.</i>
<u>1100</u>		
13200 grs. <i>Ans.</i>	2 lbs. 11 oz. 20 grs.	3 lbs. 9 oz. 7 grs.
	<u>12</u>	<u>12</u>
3 lbs. 13 dwt.	35 oz.	45 oz.
<u>12</u>	<u>20</u>	<u>20</u>
36 oz.	700 dwt.	900 dwt.
<u>20</u>	<u>24</u>	<u>24</u>
733 dwt. <i>Ans.</i>	16820 grs. <i>Ans.</i>	21607 grs. <i>Ans.</i>

(17) 23 mi. 7 fur.	2 lea. 2 mi. 7 fur.
<u>8</u>	<u>3</u>
191 fur.	8 mi.
<u>220</u>	<u>8</u>
42020 yds.	71 fur.
<u>3</u>	<u>220</u>
126060 ft. <i>Ans.</i>	15620 yds. <i>Ans.</i>



- (18) 3 fur. 135 yds. 4 in.  $\begin{array}{r} 220 \\ 795 \text{ yds.} \\ 3 \\ \hline 2385 \text{ ft.} \\ 12 \\ \hline 28624 \text{ in.} \end{array}$  *Ans.*
- 5 fur. 171 yds. 2 ft.  $\begin{array}{r} 220 \\ 1271 \text{ yds.} \\ 3 \\ \hline 3815 \text{ ft.} \\ 12 \\ \hline 45780 \text{ in.} \end{array}$  *Ans.*
- (19) 2 lea. 2 mi. 2 fur. 200 yds.  $\begin{array}{r} 3 \\ 8 \text{ mi.} \\ 8 \\ \hline 66 \text{ fur.} \\ 220 \\ \hline 14720 \text{ yds.} \\ 3 \\ \hline 44160 \text{ ft.} \end{array}$  *Ans.*
- 5 mi. 200 yds. 3 in.  $\begin{array}{r} 1760 \\ 9000 \text{ yds.} \\ 36 \\ \hline 324003 \text{ in.} \end{array}$  *Ans.*
- (20) 73 yds. 3 qrs.  $\begin{array}{r} 4 \\ 295 \text{ qrs.} \\ 4 \\ \hline 1180 \text{ na.} \end{array}$  *Ans.*
- 35 ells 4 qrs.  $\begin{array}{r} 5 \\ 179 \text{ qrs.} \\ 4 \\ \hline 716 \text{ na.} \end{array}$  *Ans.*
- (21) 54 ac. 3 ro.  $\begin{array}{r} 4 \\ 219 \text{ ro.} \\ 40 \\ \hline 8760 \text{ po.} \end{array}$  *Ans.*
- 17 sq. yds. 8 ft.  $\begin{array}{r} 9 \\ 161 \text{ sq. ft.} \\ 144 \\ \hline 23184 \text{ sq. in.} \end{array}$  *Ans.*
- (22) 7 ac. 12 po.  $\begin{array}{r} 4 \\ 28 \text{ ro.} \\ 40 \\ \hline 1132 \text{ po.} \end{array}$  *Ans.*
- 29 sq. yds.  $\begin{array}{r} 9 \\ 261 \text{ sq. ft.} \\ 144 \\ \hline 37584 \text{ in.} \end{array}$  *Ans.*
- (23) 13 cub. yds.  $\times 27 = 351$  cub. ft. *Ans.*  
7 cub. yds. 20 ft.  $\begin{array}{r} 27 \\ 209 \text{ cub. ft.} \end{array}$   $\times 1728 = 361152$  cub. in. *Ans.*
- (24) 23 cub. yds. 1000 in.  $\begin{array}{r} 27 \\ 621 \text{ cub. ft.} \\ 1728 \\ \hline 1074088 \text{ cub. in.} \end{array}$  *Ans.*
- 12 cub. yds. 23 feet.  $\begin{array}{r} 27 \\ 347 \text{ cub. ft.} \\ 1728 \\ \hline 599616 \text{ cub. in.} \end{array}$  *Ans.*
- (25) 137 gall.  $\times 4$  qts.  $\times 2$  pts.  $= 1096$  pts. *Ans.*  
13 gall. 3 qts.  $\begin{array}{r} 4 \\ 55 \text{ qts.} \end{array}$   $\times 2$  pts.  $\times 4$  gills  $= 440$  gills. *Ans.*

- (26) 17 qrs.      (27) 3 lds. 3 qrs. 3 pks.      (28) 3 lds. 3 bu.
- |   |   |   |
|---|---|---|
| $\begin{array}{r} 8 \\ 136 \text{ bu.} \\ 4 \\ 544 \text{ pks.} \\ 2 \\ \hline 1088 \text{ gal.} \end{array}$ | $\begin{array}{r} 5 \\ 18 \text{ qrs.} \\ 8 \\ 144 \text{ bu.} \\ 4 \\ \hline 579 \text{ pks.} \end{array}$ | $\begin{array}{r} 5 \\ 15 \text{ qrs.} \\ 8 \\ 123 \text{ bu.} \\ 32 \\ \hline 3936 \text{ qts.} \end{array}$ |
| <i>Ans.</i>   | <i>Ans.</i>   | <i>Ans.</i>   |
| 220 bu.   | 1158 gal. <i>Ans.</i>   | 2 qrs. 7 bu. 2 pks.   |
| 4   |   | 8   |
| 880 pks.  | 2 qrs. 1 gal.   | 23 bu.  |
| 8   | 64  | 4   |
| 7040 qts. <i>Ans.</i>   | 129 gal.  | 94 pks.   |
|   | 8   | 2   |
|   | 1032 pts. <i>Ans.</i>   | 188 gal. <i>Ans.</i>  |

- (29) 27 yrs.  $\times 365 = 9855$  days. *Ans.*  
 3 yrs. 315 da.  
 365  
 1410 da.  $\times 24$  hrs.  $\times 60$  min. = 2030400 min. *Ans.*

- (30) 5 mo. 3 wks. 4 da.      27 wks. 5 da. 15 hrs.
- |   |  |
|---|--|
| $\begin{array}{r} 4 \\ 23 \text{ wks.} \\ 7 \\ 165 \text{ da.} \\ 24 \\ \hline 3960 \text{ hrs.} \end{array}$ | $\begin{array}{r} 7 \\ 194 \text{ da.} \\ 24 \\ 4671 \text{ hrs.} \\ 3600 \\ \hline 16815600 \text{ sec.} \end{array}$ |
| <i>Ans.</i>   | <i>Ans.</i>  |

**Ex. 2.** (p. 13.)

- (1) 21  $\left\{ \begin{array}{l} 3)78790236 \text{ s.} \\ 7)26263412 \end{array} \right.$
- |   |   |
|---|---|
| $\begin{array}{r} 3751916 \text{ gui.} \end{array}$                                       | $\begin{array}{r} 4)1758960 \text{ f.} \\ 6,0)43974,0 \text{ d.} \\ \hline 7329 \text{ crs.} \end{array}$ |
| <i>Ans.</i>   | <i>Ans.</i>   |
| 4,0)15008,0 <i>siwp.</i>  | 6,0)175896,0 <i>hf. d.</i>  |
| $\begin{array}{r} \text{Ans. } \underline{\underline{\pounds 3752}} \end{array}$          | $\begin{array}{r} \text{Ans. } \underline{\underline{29316 \text{ hf. crs.}}} \end{array}$                |
| (3) 4)480144 <i>f.</i>  | 12)50000d.  |
| 12)120036 <i>d.</i>   | 2,0)416,6s. <i>8d.</i>  |
| 7)10003 <i>s.</i>   | $\begin{array}{r} \text{Ans. } \underline{\underline{\pounds 208 \text{ 6s. 8d.}}} \end{array}$           |
| $\begin{array}{r} \text{Ans. } \underline{\underline{1429 \text{ sev. sh.}}} \end{array}$ |   |

<p>(4) <math>4 \overline{)284061f.}</math>  <math>12 \overline{)71015\frac{1}{2}d.}</math>  <math>2,0 \overline{)5917s. 11\frac{1}{2}d.}</math>  <u>Ans. £295 17s. 11<math>\frac{1}{2}</math>d.</u></p>	<p><math>12 \overline{)110012d.}</math>  <math>2,0 \overline{)916,7s. 8d.}</math>  <u>Ans. £458 17s. 8d.</u></p>
---	--

(5)  $12 \overline{)101010d.}$   
 $21 \overline{)8417s. 6d.}$   
Ans. 400g. 17s. 6d.

(6)  $4 \overline{)350000f.}$   
 $12 \overline{)87500d.}$   
 $20 \overline{)7291s. 8d.}$   
Ans. £364 11s. 8d.

$4 \overline{)123290f.}$   
 $12 \overline{)30822\frac{1}{2}d.}$   
 $2,0 \overline{)256,8s. 6\frac{1}{2}d.}$   
Ans. £128 8s. 6 $\frac{1}{2}$ d.

$2 \overline{)588483hf. d.}$   
 $12 \overline{)294241\frac{1}{2}d.}$   
 $21 \overline{)24520s. 1\frac{1}{2}d.}$   
Ans. 1167g. 13s. 1 $\frac{1}{2}$ d.

(7)  $28 \overline{)37568 \text{ lbs.}}$   
 $4 \overline{)1341 \text{ qrs. 20 lbs.}}$   
 $2,0 \overline{)33,5 \text{ cwt. 1 qr.}}$   
 $16 \text{ t. 15 cwt.}$   
Ans. 16 t. 15 cwt. 1 qr. 20 lbs.

(8)  $16 \overline{)2345820 \text{ drs.}}$   
 $16 \overline{)146613 \text{ oz. 12 drs.}}$   
 $28 \overline{)9163 \text{ lbs. 5 oz.}}$   
 $4 \overline{)327 \text{ qrs. 7 lbs.}}$   
 $2,0 \overline{)8,1 \text{ cwt. 3 qrs.}}$   
 $4 \text{ t. 1 cwt.}$   
Ans. 4 t. 1 cwt. 3 qrs. 7 lbs. 5 oz. 12 drs.

$16 \overline{)108190 \text{ drs.}}$   
 $16 \overline{)6761 \text{ oz. 14 dra.}}$   
 $28 \overline{)422 \text{ lbs. 9 oz.}}$   
 $4 \overline{)15 \text{ qrs. 2 lbs.}}$   
 $3 \text{ cwt. 3 qrs.}$   
Ans. 3 cwt. 3 qrs. 2 lbs. 9 oz. 14 drs.

$16 \overline{)108234 \text{ oz.}}$   
 $28 \overline{)6764 \text{ lbs. 10 oz.}}$   
 $4 \overline{)241 \text{ qrs. 16 lbs.}}$   
 $60 \text{ cwt. 1 qr.}$   
Ans. 60 cwt. 1 qr. 16 lbs. 10 oz.

(9)  $16 \overline{)100000 \text{ oz.}}$   
 $28 \overline{)6250 \text{ lbs.}}$   
 $4 \overline{)223 \text{ qrs. 6 lbs.}}$   
 $2,0 \overline{)5,5 \text{ cwt. 3 qrs.}}$   
 $2 \text{ t. 15 cwt.}$   
Ans. 2 t. 15 cwt. 3 qrs. 6 lbs.

(10)  $16 \overline{)229601 \text{ oz.}}$   
 $28 \overline{)14350 \text{ lbs. 1 oz.}}$   
 $4 \overline{)512 \text{ qrs. 14 lbs.}}$   
 $2,0 \overline{)12,8 \text{ cwt.}}$   
 $6 \text{ t. 8 cwt.}$   
Ans. 6 t. 8 cwt. 14 lbs. 1 oz.

$16 \overline{)12821 \text{ dra.}}$   
 $16 \overline{)801 \text{ oz. 5 drs.}}$   
 $28 \overline{)50 \text{ lbs. 1 oz.}}$   
 $1 \text{ qr. 22 lbs.}$   
Ans. 1 qr. 22 lbs. 1 oz. 5 drs.

$16 \overline{)314735 \text{ drs.}}$   
 $16 \overline{)19670 \text{ oz. 15 drs.}}$   
 $28 \overline{)1229 \text{ lbs. 6 oz.}}$   
 $4 \overline{)43 \text{ qrs. 25 lbs.}}$   
Ans. 10 cwt. 3 qrs. 25 lbs. 6 oz. 15 drs.

$$\begin{array}{r}
 (11) \quad 16)156424 \text{ drs.} \\
 \quad 16)9776 \text{ oz. 7 drs.} \\
 \quad \quad 28)611 \text{ lbs.} \\
 \quad \quad \quad 4)21 \text{ qrs 23 lbs.} \\
 \quad \quad \quad \quad 5 \text{ cwt. 1 qr.} \\
 \text{Ans. } 5 \text{ cwt. 1 qr. 23 lbs. 7 drs.}
 \end{array}$$

$$\begin{array}{r}
 16)1008001 \text{ oz.} \\
 28)63000 \text{ lbs. 1 oz.} \\
 4)2250 \text{ qrs.} \\
 2,0)56,2 \text{ cwt. 2 qrs.} \\
 \quad 28 \text{ t. 2 cwt.} \\
 \text{Ans. } 28 \text{ t. 2 cwt. 2 qrs. 1 oz.}
 \end{array}$$

$$\begin{array}{r}
 (13) \quad 24)13172 \text{ grs.} \\
 \quad 2,0)54,8 \text{ dwt. 20 grs.} \\
 \quad \quad 12)27 \text{ oz. 8 dwt.} \\
 \quad \quad \quad 2 \text{ lbs. 3 oz.} \\
 \text{Ans. } 2 \text{ lbs. 3 oz. 8 dwt. 20 grs.} \\
 \quad 2,0)3006,6 \text{ dwt.} \\
 \quad 12)1503 \text{ oz. 6 dwt.} \\
 \text{Ans. } 125 \text{ lbs. 3 oz. 6 dwt.}
 \end{array}$$

$$\begin{array}{r}
 (15) \quad 24)108970 \text{ grs.} \\
 \quad 2,0)454,0 \text{ dwt. 10 grs.} \\
 \quad \quad 12)227 \text{ oz.} \\
 \text{Ans. } 18 \text{ lbs. 11 oz. 10 grs.} \\
 \quad 24)189081 \text{ grs.} \\
 \quad 2,0)787,8 \text{ dwt. 9 grs.} \\
 \quad 12)393 \text{ oz. 18 dwt.} \\
 \text{Ans. } 32 \text{ lbs. 9 oz. 18 dwt. 9 grs.}
 \end{array}$$

$$\begin{array}{r}
 (17) \quad 3)36090 \text{ ft.} \\
 \quad 22,0)1203,0 \text{ yds.} \\
 \quad \quad 8)54 \text{ fur. 150 yds.} \\
 \text{Ans. } 6 \text{ mi. 6 fur. 150 yds.} \\
 \quad 22,0)23103,1 \text{ yds.} \\
 \quad \quad 8)1050 \text{ fur. 31 yds.} \\
 \quad \quad \quad 3)131 \text{ mi. 2 fur.} \\
 \text{Ans. } 43 \text{ lea. 2 mi. 2 fur. 31 yds.}
 \end{array}$$

$$\begin{array}{r}
 (12) \quad 16)237023 \text{ oz.} \\
 \quad 28)14813 \text{ lbs. 15 oz.} \\
 \quad \quad 4)529 \text{ qrs. 1 lb.} \\
 \quad \quad \quad 2,0)13,2 \text{ cwt. 1 qr.} \\
 \quad \quad \quad \quad 6 \text{ t. 12 cwt.} \\
 \text{Ans. } 6 \text{ t. 12 cwt. 1 qr. 1 lb. 15 oz.}
 \end{array}$$

$$\begin{array}{r}
 16)371283 \text{ drs.} \\
 16)23205 \text{ oz. 3rs.} \\
 28)1450 \text{ lbs. 5 oz.} \\
 4)51 \text{ qrs. 22 lbs.} \\
 \quad 12 \text{ cwt. 3 qrs.} \\
 \text{Ans. } 12 \text{ cwt. 3 qrs. 22 lbs. 5 oz. 3 drs.}
 \end{array}$$

$$\begin{array}{r}
 (14) \quad 24)17073 \text{ grs.} \\
 \quad 2,0)71,1 \text{ dwt. 9 grs.} \\
 \quad \quad 12)35 \text{ oz. 11 dwt.} \\
 \text{Ans. } 2 \text{ lbs. 11 oz. 11 dwt. 9 grs.} \\
 \quad 24)12327 \text{ grs.} \\
 \quad 2,0)51,3 \text{ dwt. 15 grs.} \\
 \quad \quad 12)25 \text{ oz. 13 dwt.} \\
 \text{Ans. } 2 \text{ lbs. 1 oz. 13 dwt. 15 grs.}
 \end{array}$$

$$\begin{array}{r}
 (16) \quad 24)272821 \text{ grs.} \\
 \quad 2,0)1136,7 \text{ dwt. 13 grs.} \\
 \quad \quad 12)568 \text{ oz. 7 dwt.} \\
 \text{Ans. } 47 \text{ lbs. 4 oz. 7 dwt. 13 grs.} \\
 \quad 24)127272 \text{ grs.} \\
 \quad 2,0)530,3 \text{ dwt.} \\
 \quad \quad 12)265 \text{ oz. 3 dwt.} \\
 \text{Ans. } 22 \text{ lbs. 1 oz. 3 dwt.}
 \end{array}$$

$$\begin{array}{r}
 (18) \quad 12)120835 \text{ in.} \\
 \quad 3)10069 \text{ ft. 7 in.} \\
 \quad 22,0)335,6 \text{ yds. 1 ft.} \\
 \text{Ans. } 15 \text{ fur. 56 yds. 1 ft. 7 in.} \\
 \quad 3)378135 \text{ ft.} \\
 \quad 22,0)12604,5 \text{ yds.} \\
 \quad \quad 8)572 \text{ fur. 205 yds.} \\
 \text{Ans. } 71 \text{ mi. 4 fur. 205 yds.}
 \end{array}$$

- (19)  $12)517900 \text{ in.}$   
 $3)43158 \text{ ft. 4 in.}$   
 $22,0)1438,6 \text{ yds.}$   
 $8)65 \text{ fur. 86 yds.}$   
Ans. 8 mi. 1 fur. 86 yds. 4 in.
- $3)183810 \text{ ft.}$   
 $22,0)6127,0 \text{ yds.}$   
 $8)278 \text{ fur. 110 yds.}$   
 $3)34 \text{ mi. 6 fur.}$   
Ans. 11 lea. 1 mi. 6 fur. 110 yds.
- (20)  $4)13587 \text{ na.}$   
 $4)3396 \text{ qrs. 3 na.}$   
Ans. 849 yds. 3 na.
- $4)181970 \text{ na.}$   
 $5)45492 \text{ qrs. 2 na.}$   
Ans. 9098 ells 2 qrs. 2 na.
- (21)  $4,0)12132,1 \text{ po.}$   
 $4)3033 \text{ ro. 1 po.}$   
Ans. 758 ac. 1 ro. 1 po.
- $144)33333 \text{ sq. in.}$   
 $9)231 \text{ sq. ft. 69 in.}$   
Ans. 25 sq. yds. 6 ft. 69 in.
- (22)  $4,0)2000,0 \text{ po.}$   
 $4)500 \text{ ro.}$   
Ans. 125 ac.  
 $144)20000 \text{ sq. in.}$   
 $9)138 \text{ sq. ft. 128 in.}$   
Ans. 15 sq. yds. 3 ft. 128 in.
- (23)  $1728)200000 \text{ c. in.}$   
 $27)115 \text{ c. ft. 1280 in.}$   
Ans. 4 c. yds. 7 ft. 1280 in.  
 $1728)138297 \text{ c. in.}$   
 $27)80 \text{ c. ft. 57 in.}$   
Ans. 2 c. yds. 26 ft. 57 in.
- (24)  $1728)106921 \text{ c. in.}$   
 $27)61 \text{ c. ft. 1513 in.}$   
Ans. 2 c. yds. 7 ft. 1513 in.  
 $1728)18031 \text{ c. in.}$   
 $27)104 \text{ c. ft. 1119 in.}$   
Ans. 3 c. yds. 23 ft. 1119 in.
- (25)  $2)18191 \text{ pts.}$   
 $4)9095 \text{ qts. 1 pt.}$   
Ans. 2273 gal. 3 qts. 1 pt.  
 $4)30933 \text{ gills.}$   
 $2)7745 \text{ pt. 3 gills.}$   
 $4)3872 \text{ qts. 1 pt.}$   
Ans. 968 gal. 1 pt. 3 gills.
- (26)  $4)28716 \text{ qts.}$   
 $2)7179 \text{ gal.}$   
 $4)3589 \text{ pks. 1 gal.}$   
 $8 \text{ 897 bu. 1 pk.}$   
 $5)112 \text{ qrs. 1 bu.}$   
Ans. 22 lds. 2 qrs. 1 bu. 1 pk. 1 gal.  
 $2)91356 \text{ pts.}$   
 $4)45678 \text{ qts.}$   
 $2)11419 \text{ gal. 2 qts.}$   
 $4)5709 \text{ pks. 1 gal.}$   
 $8)1427 \text{ bu. 1 pk.}$   
Ans. 178 qrs. 3 bu. 1 pk. 1 gal. 2 qts.
- (27)  $4)89765 \text{ pks.}$   
 $8)22441 \text{ bu. 1 pk.}$   
 $5)2205 \text{ qrs. 1 bu.}$   
Ans. 561 lds. 1 bu. 1 pk.  
 $2)56789 \text{ pts.}$   
 $4)28394 \text{ qt. 1 pt.}$   
 $2)7098 \text{ gal. 2 qts.}$   
 $4)3549 \text{ pks.}$   
 $8)887 \text{ bu. 1 pk.}$   
 $5)110 \text{ qrs. 7 bu.}$   
 $22 \text{ lds.}$   
Ans. 22 lds. 7 bu. 1 pk. 2 qts. 1 pt.

- (28)  $4)356187$  qts.  
 $2)89046$  gal. 3 qts.  
 $4)44523$  pks.  
 $8)11130$  bu. 3 pks.  
 $5)1391$  qrs. 2 bu.  
*Ans.*  $278$  lds. 1 qr. 2 bu. 3 pks. 3 qts.  
 $2)598712$  gal.  
 $4)299356$  pks.  
 $8)74839$  bu.  
*Ans.*  $9354$  qrs. 7 bu.
- (29)  $365)137819$  da.  
*Ans.*  $377$  yrs. 214 da.  
 $6,0)356182,9$  sec.  
 $6,0)5936,3$  min. 49 sec.  
 $24)989$  hrs. 23 min.  
 $7)41$  da. 5 hrs.  
 $5$  wks. 6 da.  
*Ans.*  $5$  wks. 6 da. 5 hrs. 23 m. 49 s.
- (30)  $24)235967$  hrs.  
 $7)9831$  da. 23 hrs.  
 $1404$  wks. 3 da.  
*Ans.*  $1404$  wks. 3 da. 23 hrs.
- $6,0)7187190,0$  sec.  
 $6,0)119786,5$  min.  
 $24)19964$  hrs. 25 min.  
 $365)831$  da. 20 hrs.  
*Ans.*  $2$  yrs. 101 da. 20 hrs. 25 min

*Answers to Ex. 3. (p. 14.)*

- |                                    |   |                                   |
|------------------------------------|---|-----------------------------------|
| (1) £ 12 s. 8 d.                   | (2) £ 149 s. 18 d.                      | (3) £ 207 s. 12 d.                |
| (4) £ 162 s. 14 d.                 | (5) £ 120 s. 1 d.                       | (6) £ 87 s. 1 d.                  |
| (7) £ 114 s. 12 d. $10\frac{1}{4}$ | (8) £ 169 s. 19 d. $0\frac{1}{2}$       | (9) £ 110 s. 17 d. $5\frac{3}{4}$ |
| (10) £ 82 s. 1 d. 10               | (11) £ 172 s. 2 d. $1\frac{1}{4}$       | (12) £ 193 s. 2 d. $2\frac{3}{8}$ |
| (13) lbs. oz. dr. 47 1 11          | (14) qrs. lbs. oz. 8 18 12              | (15) cwt. qrs. lbs. 61 3 0        |
| (16) qrs. lbs. oz. 80 15 0         | (17) qrs. lbs. oz. dr. 12 11 5 9        | (18) cwt. qrs. lbs. oz. 120 2 0 2 |
| (19) tons cwt. qrs. lbs. 43 9 2 17 | (20) oz. dwt. gr. 31 1 14               | (21) lbs. oz. dwt. 84 7 9         |
| (22) oz. dwt. gr. 34 15 11         | (23) lbs. oz. dwt. 133 5 10             | (24) lbs. oz. dwt. gr. 116 6 2 23 |
| (25) lbs. oz. dwt. gr. 107 1 10 17 | (26) lbs. oz. dwt. gr. 73 2 0 1         | (27) dr. scr. gr. 22 2 16         |
| (28) oz. dr. scr. 36 4 2           | (29) dr. scr. gr. 37 0 7                | (30) oz. dr. scr. 39 6 1          |
| (31) yds. ft. in. 58 0 3           | (32) fur. po. yds. 24 34 4              | (33) m. fur. yds. 21 0 54         |
| (34) lea. m. fur. 27 0 6           | (35) fur. po. yds. 22 10 $4\frac{1}{2}$ | (36) po. yd. ft. 102 0 1          |
| (37) yds. ft. in. 30 1 2           | (38) po. yds. ft. in. 28 4 2 11         | (39) po. yds. ft. in. 32 4 0 7    |
| (40) m. fur. po. yds. 119 2 27 2   | (41) m. fur. yds. ft. 27 0 133 2        | (42) yds. qrs. na. 167 0 1        |

(43) yds. qrs. na. 984 0 0	(44) ells qrs. na. 328 3 1	(45) ells qrs. na. 142 0 1
(46) s.yds. s.ft. s.in. 115 3 44	(47) R. P. s.yds. 30 9 18	(48) A. R. P. 131 0 21
(49) A. R. P. 162 2 23	(50) P. s.yds. s.ft. s.in. 16 24 3 101	(51) A. R. P. s.yds. 98 2 18 23
(52) A. P. s.yds. ft. in. 103 9 26 2 59	(53) c.yds. c.ft. c.in. 92 9 429	(54) c.yds. c.ft. c.in. 106 10 8
(55) c.yds. c.ft. c.in. 95 11 108	(56) gals. qts. pt. 150 3 1	(57) gals. qts. pt. 103 3 1
(58) pks. gal. qt. 21 1 1	(59) bus. pk. gal. 115 1 1	(60) qrs. bus. pks. 119 2 2
(61) lds. qrs. bus. 119 4 4	(62) bus. gal. qt. 124 5 1	(63) bus. pks. gal. 168 3 1
(64) gal. qt. pt. gills 93 1 0 3	(65) bus. pks. gal. qts. 155 3 1 2	(66) qrs. bus. pks. gal. 150 0 3 1
(67) d. h. m. s. 22 2 28 59	(68) mo. w. d. h. 115 1 1 14	(69) d. h. m. s. 20 21 49 48
(70) y. d. h. m. 32 114 21 3	(71) y. w. d. h. 94 41 6 11	(72) y. d. h. 28 184 4

## Answers to Ex. 2. (p. 18.)

(1) £ s. d. 10 3 3	(2) £ s. d. 33 7 2½	(3) £ s. d. 60 12 2½	(4) £ s. d. 15 3 10
(5) 55 9 10	(6) 8 7 6	(7) 2 18 1¾	(8) 187 1 2½
(9) 25 17 2½	(10) 38 2 0½	(11) 77 15 1¾	(12) 215 2 3¼
(13) lbs. oz. drs. 14 4 2	(14) qrs. lbs. oz. 7 18 3	(15) cwt. qrs. lbs. 20 2 15	(16) qrs. lbs. oz. 0 25 7
(17) qrs. lbs. oz. 8 11 4	(18) ton cwt. qrs. 1 6 2	(19) cwt. lbs. oz. 14 27 12	(20) qrs. lbs. oz. 3 21 6
(21) oz. dwt. gr. 3 4 10	(22) oz. dwt. gr. 13 17 23	(23) lbs. oz. dwt. 6 7 17	(24) oz. dwt. gr. 8 1 2
(25) oz. dwt. gr. 21 4 8	(26) oz. dwt. gr. 36 8 11	(27) oz. dwt. gr. 8 10 15	(28) oz. dwt. gr. 14 6 6
(29) dr. scr. gr. 3 0 19	(30) oz. dr. scr. 2 2 1	(31) lbs. oz. dr. 17 7 7	(32) dr. scr. gr. 1 0 16
(33) yd. ft. in. 1 1 9	(34) po. yds. ft. 9 3 2	(35) fur. po. yds. 5 21 3	(36) m. fur. yds. 4 6 124
(37) m. fur. po. 12 2 29	(38) fur. po. yds. 1 18 5	(39) lea. m. fur. 18 2 6	(40) fur. po. yds. 0 27 4
(41) po. yds. ft. 7 4 1	(42) yds. ft. in. 7 0 5	(43) yds. qrs. na. 4 3 1	(44) ells qrs. na. 4 4 2
(45) s.yds. s.ft. s.in. 6 2 86	(46) po. s.yds. s.ft. 8 22 6	(47) ro. po. s.yds. 0 6 27	(48) ac. ro. po. 13 2 34
(49) ac. ro. po. 25 2 36	(50) ro. po. s.yds. 1 13 22	(51) ro. s.yds. s.ft. 2 2 8½	(52) s.yds. s.ft. s.in. 3 3 27

c.yds. c.ft. c.in.	c.yds. c.ft. c.in.	c.yds. c.ft. c.in.	c.yds. c.ft. c.in.
(53) 12 14 1071	(54) 29 4 655	(55) 33 4 1385	(56) 13 16 999
gals. qts. pt.	gals. qt. pt.	pkts. gal. qt.	bus. pkts. gal.
(57) 2 2 1	(58) 5 1 1	(59) 3 1 1	(60) 18 2 1
qrs. bus. pkts.	lds. qrs. bus.	bus. pk. gal.	lds. qr. bus.
(61) 5 3 3	(62) 12 4 6	(63) 17 1 1	(64) 2 1 4
hrs. m. s.	d. hrs. m.	w. d. hrs.	mo. w. d.
(65) 13 57 49	(66) 7 19 45	(67) 0 5 13	(68) 3 2 6
yrs. d. hrs.	yrs. w. d.	yrs. w. d.	yrs. d. hrs.
(69) 12 196 9	(70) 8 39 5	(71) 10 43 4	(72) 6 346 14

Answers to Ex. 5. (p. 19.)

£ s. d.	£ s. d.	£ s. d.
(1) 46 16 8	(2) 75 6 10½	(3) 179 0 9
(4) 146 12 10½	(5) 312 10 8	(6) 387 2 2
(7) 499 7 1	(8) 378 11 1¾	(9) 1029 19 0
(10) 927 7 10½	(11) 940 7 3	(12) 1131 8 4½
(13) 1325 13 4	(14) 1391 7 6	(15) 1038 9 9
(16) 1221 18 6¾	(17) 1242 13 4	(18) 1752 7 11
(19) 1888 13 1	(20) 2020 1 10½	(21) 444 2 9
(22) 618 0 6	(23) 1546 7 0	(24) 2060 1 3

Ex. 6. (p. 20.)

(1) £23 17s. 5½d. × 15	(2) £79 14s. 10¼d. × 18
$\begin{array}{r} 3 \\ 71\ 12\ 4\frac{1}{2} \\ 5 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ 478\ 9\ 1\frac{1}{2} \\ 3 \\ \hline \end{array}$
<u>£358 1 10½</u> Ans.	<u>£1435 7 4½</u> Ans.
(3) £93 8s. 3½d. × 21	(4) £49 12s. 8d. × 28
$\begin{array}{r} 7 \\ 653\ 18\ 0\frac{1}{2} \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ 198\ 10\ 8 \\ 7 \\ \hline \end{array}$
<u>£1961 14 1½</u> Ans.	<u>£1389 14 8</u> Ans.
(5) £68 7s. 4¾d. × 35	(6) £97 19s. 9½d. × 48
$\begin{array}{r} 5 \\ 341\ 16\ 11\frac{3}{4} \\ 7 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ 587\ 18\ 9 \\ 8 \\ \hline \end{array}$
<u>£2392 18 10½</u> Ans.	<u>£4703 10 0</u> Ans.



- (7) £87 4s.  $3\frac{1}{2}d.$   $\times 64$   
 $\begin{array}{r} 8 \\ 697\ 14\ 2 \\ 8 \\ \hline \end{array}$   
£5581 13 4 *Ans.*
- (8) £92 11s.  $10d.$   $\times 70$   
 $\begin{array}{r} 10 \\ 925\ 18\ 4 \\ 7 \\ \hline \end{array}$   
£6481 8 4 *Ans.*
- (9) £37 13s.  $2\frac{1}{2}d.$   $\times 81$   
 $\begin{array}{r} 9 \\ 338\ 18\ 10\frac{1}{2} \\ 9 \\ \hline \end{array}$   
£3050 9 10\frac{1}{2}
- (10) £42 10s.  $9\frac{1}{2}d.$   $\times 88$   
 $\begin{array}{r} 8 \\ 340\ 6\ 2 \\ 11 \\ \hline \end{array}$   
£3743 7 10 *Ans.*
- (11) £98 18s.  $3d.$   $\times 96$   
 $\begin{array}{r} 12 \\ 1186\ 19\ 0 \\ 8 \\ \hline \end{array}$   
£9495 12 0 *Ans.*
- (12) £43 12s.  $5\frac{3}{4}d.$   $\times 132$   
 $\begin{array}{r} 12 \\ 523\ 9\ 9 \\ 11 \\ \hline \end{array}$   
£5758 7 3 *Ans.*
- (13) £22 10s.  $8\frac{1}{2}d.$   $\times 128$   
 $\begin{array}{r} 8 \\ 180\ 5\ 8 \\ 8 \\ \hline \end{array}$   
 $\begin{array}{r} 1442\ 5\ 4 \\ 2 \\ \hline \end{array}$   
£2884 10 8 *Ans.*
- (14) £3 15s.  $6d.$   $\times 176$   
 $\begin{array}{r} 4 \\ 15\ 2\ 0 \\ 11 \\ \hline \end{array}$   
 $\begin{array}{r} 166\ 2\ 0 \\ 4 \\ \hline \end{array}$   
£664 8 0 *Ans.*
- (15) £10 11s.  $8\frac{1}{2}d.$   $\times 270$   
 $\begin{array}{r} 10 \\ 105\ 16\ 10\frac{1}{2} \\ 9 \\ \hline \end{array}$   
 $\begin{array}{r} 952\ 11\ 10\frac{1}{2} \\ 3 \\ \hline \end{array}$   
£2857 15 7\frac{1}{2} *Ans.*
- (16) £13 7s.  $4\frac{3}{4}d.$   $\times 275$   
 $\begin{array}{r} 11 \\ 147\ 1\ 4\frac{1}{2} \\ 5 \\ \hline \end{array}$   
 $\begin{array}{r} 735\ 6\ 9\frac{1}{4} \\ 5 \\ \hline \end{array}$   
£3676 13 10\frac{1}{4} *Ans.*

**EX. 7.** (p. 21.)

**NOTE.**—The method here used for the first ten examples deserves to be known by the pupil, but is not better than that given in Art. 8 of the text.

- (1) £43 8s.  $6\frac{1}{4}d.$   $\times 1$   
 $\begin{array}{r} 9 \times 2 + 1 \\ 390\ 16\ 8\frac{1}{4} \\ 2 \\ \hline \end{array}$   
 $\begin{array}{r} 781\ 13\ 4\frac{1}{2} \\ \hline \end{array}$   
£825 1 10\frac{3}{4} *Ans.*
- (2) £47 13s.  $2\frac{1}{2}d.$   $\times 1$   
 $\begin{array}{r} 2 \times 11 + 1 \\ 95\ 6\ 5 \\ 11 \\ \hline \end{array}$   
 $\begin{array}{r} 1048\ 10\ 7 \\ \hline \end{array}$   
£1096 3 9\frac{1}{2} *Ans.*

$$\begin{array}{r}
 \text{(3)} \quad \text{£}33 \text{ 15s. } 8\frac{1}{2}d. \times 1 \\
 \quad \quad \quad 4 \times 7 + 1 \\
 \hline
 135 \quad 2 \quad 9 \\
 \quad \quad \quad 7 \\
 \hline
 945 \quad 19 \quad 3 \\
 \hline
 \text{£}979 \quad 14 \quad 11\frac{1}{2} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(4)} \quad \text{£}79 \text{ 16s. } 3d. \times 1 \\
 \quad \quad \quad 11 \times 3 + 1 \\
 \hline
 877 \quad 18 \quad 9 \\
 \quad \quad \quad 3 \\
 \hline
 2633 \quad 16 \quad 3 \\
 \hline
 \text{£}2713 \quad 12 \quad 6 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(5)} \quad \text{£}18 \text{ 15s. } 2\frac{1}{2}d. \times 1 \\
 \quad \quad \quad 12 \times 4 - 1 \\
 \hline
 225 \quad 2 \quad 6 \\
 \quad \quad \quad 4 \\
 \hline
 900 \quad 10 \quad 0 \\
 18 \quad 15 \quad 2\frac{1}{2} \\
 \hline
 \text{£}881 \quad 14 \quad 9\frac{1}{2} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(6)} \quad \text{£}24 \text{ 14s. } 3\frac{1}{4}d. \times 1 \\
 \quad \quad \quad 9 \times 7 - 1 \\
 \hline
 222 \quad 8 \quad 5\frac{1}{4} \\
 \quad \quad \quad 7 \\
 \hline
 1556 \quad 19 \quad 0\frac{3}{4} \\
 24 \quad 14 \quad 3\frac{1}{4} \\
 \hline
 \text{£}1532 \quad 4 \quad 9\frac{1}{8} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(7)} \quad \text{£}19 \text{ 10s. } 8\frac{1}{2}d. \times 1 \\
 \quad \quad \quad 10 \times 8 - 1 \\
 \hline
 195 \quad 7 \quad 1 \\
 \quad \quad \quad 8 \\
 \hline
 1562 \quad 16 \quad 8 \\
 19 \quad 10 \quad 8\frac{1}{2} \\
 \hline
 \text{£}1543 \quad 5 \quad 11\frac{1}{2} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(8)} \quad \text{£}15 \text{ 17s. } 4\frac{3}{4}d. \times 3 \\
 \quad \quad \quad 10 \times 9 + 3 \\
 \hline
 158 \quad 13 \quad 11\frac{1}{2} \\
 \quad \quad \quad 9 \\
 \hline
 1428 \quad 5 \quad 7\frac{1}{4} \\
 47 \quad 12 \quad 2\frac{1}{4} \\
 \hline
 \text{£}1475 \quad 17 \quad 9\frac{3}{4} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(9)} \quad \text{£}23 \text{ 18s. } 6\frac{1}{4}d. \times 2 \\
 \quad \quad \quad 12 \times 9 - 2 \\
 \hline
 287 \quad 2 \quad 3 \\
 \quad \quad \quad 9 \\
 \hline
 2584 \quad 0 \quad 3 \\
 47 \quad 17 \quad 0\frac{1}{2} \\
 \hline
 \text{£}2536 \quad 3 \quad 2\frac{1}{2} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(10)} \quad \text{£}16 \text{ 13s. } 7\frac{3}{4}d. \times 7 \\
 \quad \quad \quad 12 \times 11 + 7 \\
 \hline
 200 \quad 3 \quad 9 \\
 \quad \quad \quad 11 \\
 \hline
 2202 \quad 1 \quad 3 \\
 116 \quad 15 \quad 6\frac{1}{4} \\
 \hline
 \text{£}2318 \quad 16 \quad 9\frac{1}{2} \quad \text{Ans.}
 \end{array}$$

(11)

(12)

*Ans.* 6 cwt. 1 qr. 26 lbs. 15 oz. 8 drs. *Ans.* 41 t. 18 cwt. 1 qr. 18 lbs. 10 oz.

$$\begin{array}{r}
 \text{(13)} \quad \begin{array}{cccc} \text{t.} & \text{cwt.} & \text{qrs.} & \text{lbs.} & \text{oz.} \end{array} \\
 \quad \quad \quad 5 \quad 27 \quad 0 \quad 27 \quad 5 \times 25 \\
 \quad \quad \quad \quad \quad \quad \quad \quad 5 \\
 \hline
 31 \quad 16 \quad 0 \quad 24 \quad 9 \\
 \quad \quad \quad \quad \quad \quad \quad 5 \\
 \hline
 159 \quad 1 \quad 0 \quad 10 \quad 13 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(14)} \quad \begin{array}{cccc} \text{t.} & \text{cwt.} & \text{qrs.} & \text{lbs.} & \text{oz.} \end{array} \\
 \quad \quad \quad 9 \quad 16 \quad 1 \quad 0 \quad 5 \times 32 \\
 \quad \quad \quad \quad \quad \quad \quad \quad 8 \\
 \hline
 78 \quad 10 \quad 0 \quad 2 \quad 8 \\
 \quad \quad \quad \quad \quad \quad \quad 4 \\
 \hline
 314 \quad 0 \quad 0 \quad 10 \quad 0 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(15)} \quad \begin{array}{cccccc} \text{t.} & \text{cwt.} & \text{qrs.} & \text{lbs.} & \text{oz.} & \text{drs.} \end{array} \\
 \quad \quad \quad 0 \quad 17 \quad 3 \quad 0 \quad 15 \quad 7 \times 36 \\
 \quad \quad \quad \quad \quad \quad \quad \quad 6 \\
 \hline
 5 \quad 6 \quad 2 \quad 5 \quad 12 \quad 10 \\
 \quad \quad \quad \quad \quad \quad \quad 6 \\
 \hline
 31 \quad 19 \quad 1 \quad 6 \quad 11 \quad 12 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(16)} \quad \begin{array}{cccccc} \text{t.} & \text{cwt.} & \text{qrs.} & \text{lbs.} & \text{oz.} & \text{drs.} \end{array} \\
 \quad \quad \quad 18 \quad 0 \quad 3 \quad 5 \quad 0 \quad 13 \times 45 \\
 \quad \quad \quad \quad \quad \quad \quad \quad 9 \\
 \hline
 162 \quad 7 \quad 0 \quad 17 \quad 7 \quad 5 \\
 \quad \quad \quad \quad \quad \quad \quad 5 \\
 \hline
 811 \quad 15 \quad 3 \quad 3 \quad 4 \quad 9 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{lbs. oz. dwt. grs.} \\
 (17) \quad 3 \quad 8 \quad 15 \quad 13 \times 49 \\
 \qquad \qquad \qquad 7 \\
 \hline
 26 \quad 1 \quad 8 \quad 19 \\
 \qquad \qquad \qquad 7 \\
 \hline
 182 \quad 10 \quad 1 \quad 13 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{lbs. oz. dwt. grs.} \\
 (18) \quad 2 \quad 7 \quad 9 \quad 22 \times 50 \\
 \qquad \qquad \qquad 10 \\
 \hline
 26 \quad 2 \quad 19 \quad 4 \\
 \qquad \qquad \qquad 5 \\
 \hline
 131 \quad 2 \quad 15 \quad 20 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{lea. mi. fur. yds. ft. in.} \\
 (19) \quad 0 \quad 0 \quad 5 \quad 78 \quad 2 \quad 7 \times 56 \\
 \qquad \qquad \qquad 7 \\
 \hline
 1 \quad 1 \quad 5 \quad 112 \quad 0 \quad 1 \\
 \qquad \qquad \qquad 8 \\
 \hline
 12 \quad 1 \quad 4 \quad 16 \quad 0 \quad 8 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{lea. mi. fur. yds. ft. in.} \\
 (20) \quad 0 \quad 0 \quad 7 \quad 87 \quad 1 \quad 5 \times 64 \\
 \qquad \qquad \qquad 8 \\
 \hline
 2 \quad 1 \quad 3 \quad 39 \quad 2 \quad 4 \\
 \qquad \qquad \qquad 8 \\
 \hline
 19 \quad 2 \quad 1 \quad 98 \quad 0 \quad 8 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{ac. ro. po.} \\
 (21) \quad 5 \quad 3 \quad 27 \times 70 \\
 \qquad \qquad \qquad 10 \\
 \hline
 59 \quad 0 \quad 30 \\
 \qquad \qquad \qquad 7 \\
 \hline
 414 \quad 1 \quad 10 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{ac. ro. po.} \\
 (22) \quad 17 \quad 1 \quad 31 \times 72 \\
 \qquad \qquad \qquad 8 \\
 \hline
 139 \quad 2 \quad 8 \\
 \qquad \qquad \qquad 9 \\
 \hline
 1255 \quad 3 \quad 32 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{sq. yds. ft. in.} \\
 (23) \quad 3 \quad 9 \quad 131 \times 80 \\
 \qquad \qquad \qquad 8 \\
 \hline
 31 \quad 8 \quad 40 \\
 \qquad \qquad \qquad 10 \\
 \hline
 319 \quad 1 \quad 112 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{c. yds. ft. in.} \\
 (24) \quad 17 \quad 21 \quad 57 \times 84 \\
 \qquad \qquad \qquad 12 \\
 \hline
 213 \quad 9 \quad 684 \\
 \qquad \qquad \qquad 7 \\
 \hline
 1493 \quad 11 \quad 1332 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{gal. qts. pt.} \\
 (25) \quad 87 \quad 3 \quad 1 \times 90 \\
 \qquad \qquad \qquad 10 \\
 \hline
 878 \quad 3 \quad 0 \\
 \qquad \qquad \qquad 9 \\
 \hline
 7908 \quad 3 \quad 0 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{gal. qts. pt.} \\
 (26) \quad 37 \quad 2 \quad 1 \times 96 \\
 \qquad \qquad \qquad 12 \\
 \hline
 451 \quad 2 \quad 0 \\
 \qquad \qquad \qquad 8 \\
 \hline
 3612 \quad 0 \quad 0 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{lds. qrs. bu. pks.} \\
 (27) \quad 0 \quad 4 \quad 6 \quad 2 \times 100 \\
 \qquad \qquad \qquad 10 \\
 \hline
 9 \quad 3 \quad 1 \quad 0 \\
 \qquad \qquad \qquad 10 \\
 \hline
 96 \quad 1 \quad 2 \quad 0 \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{lds. qrs. bu. pks.} \\
 (28) \quad 0 \quad 3 \quad 5 \quad 2 \times 108 \\
 \qquad \qquad \qquad 12 \\
 \hline
 8 \quad 4 \quad 2 \quad 0 \\
 \qquad \qquad \qquad 9 \\
 \hline
 79 \quad 3 \quad 2 \quad 0 \quad \text{Ans.}
 \end{array}$$

	yrs.	da.	hrs.	min.	sec.		yrs.	da.	hrs.	min.	sec.
(29)	0	5	17	39	$20 \times 120$	(30)	17	110	17	0	$57 \times 144$
					12						12
	0	68	19	52	0		207	233	12	11	24
					10						12
	1	323	6	40	0	Ans.	2491	247	2	16	48
											Ans.

*Answers to Ex. 8. (p. 22.)*

	£	s.	d.		£	s.	d.		£	s.	d.		£	s.	d.
(1)	13	7	$7\frac{3}{4}$	(2)	4	4	$9\frac{1}{4}$	(3)	14	3	11	(4)	15	7	$5\frac{1}{4}$
(5)	14	1	$8\frac{1}{2}$	(6)	12	19	$1\frac{1}{4}$	(7)	9	8	$5\frac{1}{2}$	(8)	9	15	$2\frac{1}{2}$
(9)	9	3	$5\frac{1}{4}$	(10)	6	16	$1\frac{3}{4}$	(11)	4	16	1	(12)	7	6	$1\frac{1}{2}$

*Ex. 9. (p. 22.)*

(1)	(2)	(3)	(4)
£17,6 16s. 8d.	£3,0 6s. 3d.	£3,29 1s. 3d.	£78 12s. 11d.
20	20	20	20
13,6s.	0,6s.	5,81s.	14,72s.
12	12	12	12
8,0d.	7,5d.	9,75d.	8,75d.
£17 13s. 8d. Ans.	4	4	4
	2,0f.	3,00f.	3,00f.
	£3 0s. $7\frac{1}{2}$ d. Ans.	£3 5s. $9\frac{3}{4}$ d. Ans.	£0 14s. $8\frac{3}{4}$ d. Ans.
(5)	(6)	(7)	(8)
£1,511 9s. 2d.	£72 18s. 4d.	£645 16s. 8d.	£1062 10s.
20	20	20	20
10,229s.	1,458s.	1,2916s.	2,1250s.
12	12	12	12
2,750d.	5,500d.	3,5000d.	1,5000d.
4	4	4	4
3,000f.	2,000f.	2,0000f.	2,0000f.
30s. $2\frac{3}{4}$ d. Ans.	1s. $5\frac{1}{2}$ d.	1s. $3\frac{1}{4}$ d. Ans.	2s. $1\frac{1}{4}$ d. Ans.

## Ex. 10. (p. 23.)

- (1)  $20 \left\{ \begin{array}{l} 2) £702 \text{ 6s. 3d.} \\ 10) 351 \text{ 3 } 1\frac{1}{2} \\ \hline \text{Ans. } £35 \text{ 2 } 3\frac{3}{4} \end{array} \right.$
- (2)  $14 \left\{ \begin{array}{l} 2) £187 \text{ 14s. 11d.} \\ 7) 93 \text{ 17 } 5\frac{1}{2} \\ \hline \text{Ans. } £13 \text{ 8 } 2\frac{1}{2} \end{array} \right.$
- (3)  $18 \left\{ \begin{array}{l} 2) £275 \text{ 15s. } 1\frac{1}{2}d. \\ 9) 137 \text{ 17 } 6\frac{3}{4} \\ \hline \text{Ans. } £15 \text{ 6 } 4\frac{3}{4} \end{array} \right.$
- (4)  $40 \left\{ \begin{array}{l} 4) £345 \text{ 13s. 4d.} \\ 10) 86 \text{ 8 } 4 \\ \hline \text{Ans. } £8 \text{ 12 } 10 \end{array} \right.$
- (5)  $25 \left\{ \begin{array}{l} 5) £345 \text{ 10s. 5d.} \\ 5) 69 \text{ 2 } 1 \\ \hline \text{Ans. } £13 \text{ 16 } 5 \end{array} \right.$
- (6)  $32 \left\{ \begin{array}{l} 4) £351 \text{ 14 } 8d. \\ 8) 87 \text{ 18 } 8 \\ \hline \text{Ans. } £10 \text{ 19 } 10 \end{array} \right.$
- (7)  $120 \left\{ \begin{array}{l} 12) £485 \text{ 17s. 6d.} \\ 10) 40 \text{ 9 } 9\frac{1}{2} \\ \hline \text{Ans. } £4 \text{ 0 } 11\frac{3}{4} \end{array} \right.$
- (8)  $400 \left\{ \begin{array}{l} 4) £457 \text{ 18s. 4d.} \\ 100) 114 \text{ 9 } 7 \\ \hline \text{Ans. } £1 \text{ 2 } 10\frac{3}{4} \end{array} \right.$
- (9)  $36 \left\{ \begin{array}{l} 4) £208 \text{ 16s. 9d.} \\ 9) 52 \text{ 4 } 2\frac{1}{2} \\ \hline \text{Ans. } £5 \text{ 16 } 0\frac{1}{2} \end{array} \right.$
- (10)  $42 \left\{ \begin{array}{l} 7) £362 \text{ 19s. } 10\frac{1}{2}d. \\ 6) 51 \text{ 17 } 1\frac{1}{2} \\ \hline \text{Ans. } £8 \text{ 12 } 10\frac{1}{4} \end{array} \right.$
- (11)  $800 \left\{ \begin{array}{l} 8) £692 \text{ 10s. 0d.} \\ 100) 86 \text{ 11 } 3 \\ \hline \text{Ans. } £0 \text{ 17 } 3\frac{3}{4} \end{array} \right.$
- (12)  $2400 \left\{ \begin{array}{l} 8) £1137 \text{ 10s. 0d.} \\ 3) 142 \text{ 3 } 9 \\ 100) 47 \text{ 7 } 11 \\ \hline \text{Ans. } £0 \text{ 9 } 5\frac{3}{4} \end{array} \right.$
- (13)  $45 \left\{ \begin{array}{l} 5) £347 \text{ 1s. 3d.} \\ 9) 69 \text{ 8 } 3 \\ \hline \text{Ans. } £7 \text{ 14 } 3 \end{array} \right.$
- (14)  $63 \left\{ \begin{array}{l} 7) £457 \text{ 1s. } 6\frac{3}{4}d. \\ 9) 65 \text{ 5 } 11\frac{1}{4} \\ \hline \text{Ans. } £7 \text{ 5 } 1\frac{1}{2} \end{array} \right.$
- (15)  $6000 \left\{ \begin{array}{l} 6) £362 \text{ 10s. 0d.} \\ 1000) 60 \text{ 8 } 4 \\ \hline \text{Ans. } £0 \text{ 1 } 2\frac{1}{2} \end{array} \right.$
- (16)  $3600 \left\{ \begin{array}{l} 12) £1556 \text{ 5s. 0d.} \\ 3) 129 \text{ 13 } 9 \\ 100) 43 \text{ 4 } 7 \\ \hline \text{Ans. } £0 \text{ 8 } 7\frac{3}{4} \end{array} \right.$
- (17)  $54 \left\{ \begin{array}{l} 6) £408 \text{ 0s. 9d.} \\ 9) 68 \text{ 0 } 1\frac{1}{3} \\ \hline \text{Ans. } £7 \text{ 11 } 1\frac{1}{3} \end{array} \right.$
- (18)  $77 \left\{ \begin{array}{l} 7) £453 \text{ 11s. } 6\frac{3}{4}d. \\ 11) 64 \text{ 15 } 11\frac{1}{4} \\ \hline \text{Ans. } £5 \text{ 17 } 9\frac{3}{4} \end{array} \right.$
- (19)  $81 \left\{ \begin{array}{l} 9) £363 \text{ 18s. } 2\frac{1}{2}d. \\ 9) 40 \text{ 8 } 8\frac{1}{2} \\ \hline \text{Ans. } £4 \text{ 9 } 10\frac{1}{2} \end{array} \right.$
- (20)  $96 \left\{ \begin{array}{l} 12) £473 \text{ 14s. 0d.} \\ 8) 39 \text{ 9 } 6 \\ \hline \text{Ans. } £4 \text{ 18 } 8\frac{1}{4} \end{array} \right.$

$$(21) \quad 99 \left\{ \begin{array}{r} 9) £386 \ 16s. \ 5\frac{1}{2}d. \\ 11) 42 \ 19 \ 7\frac{1}{2} \\ \hline \end{array} \right.$$

*Ans.* £3 18 1 $\frac{3}{4}$

$$(22) \quad 108 \left\{ \begin{array}{r} 9) £374 \ 19s. \ 3d. \\ 12) 41 \ 13 \ 3 \\ \hline \end{array} \right.$$

*Ans.* £3 9 5 $\frac{1}{2}$

$$(23) \quad 132 \left\{ \begin{array}{r} 12) £319 \ 2s. \ 9d. \\ 11) 26 \ 11 \ 10\frac{3}{4} \\ \hline \end{array} \right.$$

*Ans.* £2 8 4 $\frac{1}{2}$

$$(24) \quad 144 \left\{ \begin{array}{r} 12) £576 \ 3s. \ 0d. \\ 12) 48 \ 0 \ 3 \\ \hline \end{array} \right.$$

*Ans.* £4 0 0 $\frac{1}{2}$

**Ex. 11.** (p. 23.)

$$(1) \quad 13) £375 \ 13s. \ 5\frac{1}{2}d. (\text{£}28 \ 17s. \ 11\frac{1}{2}d. \text{ Ans.}) \quad (2) \quad 17) £289 \ 0s. \ 8\frac{1}{2}d. (17 \ 0s. \ 0\frac{1}{2}d. \text{ Ans.})$$

$$\begin{array}{r} 26 \\ \hline 115 \\ 104 \\ \hline 11 \\ 20 \\ \hline 233s. \\ 13 \\ \hline 103 \\ 91 \\ \hline 12 \\ 12 \\ \hline 149d. \\ 143 \\ \hline 6 \\ 4 \\ \hline 26f. \\ 26 \\ \hline \end{array}$$

$$\begin{array}{r} 17 \\ \hline 119 \\ 119 \\ \hline \end{array} \quad \begin{array}{r} 4 \\ \hline 34f. \\ 34 \\ \hline \end{array}$$

$$(3) \quad 10) £258 \ 1s. \ 8d. + 190$$

*Ans.* 19) 25 16 2 (£1 7s. 2d. Ans.)

$$\begin{array}{r} 19 \\ \hline 6 \\ 20 \\ \hline 136s. \\ 133 \\ \hline 3 \\ 12 \\ \hline 38d. \\ 38 \\ \hline \end{array}$$

$$(4) \quad 23) £456 \ 0s. \ 11\frac{1}{4}d. (\text{£}19 \ 16s. \ 6\frac{3}{4}d. \text{ Ans.})$$

$$\begin{array}{r} 23 \\ \hline 226 \\ 207 \\ \hline 19 \\ 20 \\ \hline 380s. \\ 23 \\ \hline 150 \\ 138 \\ \hline 12 \\ 12 \\ \hline 155d. \\ 138 \\ \hline 17 \\ 4 \\ \hline 69f. \\ 69 \\ \hline \end{array}$$

(5)

$$29) £371 \text{ 2s. } 9\frac{1}{2}d. (\text{£}12 \text{ 15s. } 11\frac{1}{2}d. \text{ Ans.})$$

$$\begin{array}{r} 348 \\ \underline{23} \\ 20 \\ \underline{462s.} \\ 29 \\ \underline{172} \\ 145 \\ \underline{27} \\ 12 \\ \underline{333d.} \\ 319 \\ \underline{14} \\ 4 \\ \underline{58f.} \\ 58 \\ \hline \end{array}$$

(6)

$$100) £513 \text{ 8s. } 9d. \div 3100$$

$$31) 5 \text{ 2 } 8\frac{1}{4} (\text{£}0 \text{ 3s. } 3\frac{3}{4}d. \text{ Ans.})$$

$$\begin{array}{r} 20 \\ \underline{102s.} \\ 93 \\ \underline{9} \\ 12 \\ \underline{116d.} \\ 93 \\ \underline{23} \\ 4 \\ \underline{93f.} \\ 93 \\ \hline \end{array}$$

(7)

$$10) £412 \text{ 0s. } 2\frac{1}{2}d. + 370$$

$$37) 41 \text{ 4 } 0\frac{1}{2} (\text{£}1 \text{ 2s. } 3\frac{1}{2}d. \text{ Ans.})$$

$$\begin{array}{r} 37 \\ \underline{4} \\ 20 \\ \underline{84s.} \\ 74 \\ \underline{10} \\ 12 \\ \underline{120d.} \\ 111 \\ \underline{9} \\ 4 \\ \underline{37f.} \\ 37 \\ \hline \end{array}$$

(8)

$$41) £712 \text{ 18s. } 7\frac{1}{2}d. (\text{£}17 \text{ 7s. } 9\frac{1}{2}d. \text{ A})$$

$$\begin{array}{r} 41 \\ \underline{302} \\ 287 \\ \underline{15} \\ 20 \\ \underline{318s.} \\ 287 \\ \underline{31} \\ 12 \\ \underline{379d.} \\ 369 \\ \underline{10} \\ 4 \\ \underline{41f.} \\ 41 \\ \hline \end{array}$$

# COMPOUND DIVISION.

(9)		(10)	
123)£1375	13s. 6½d. (£11 3s. 8½d. Ans.)	100)£2559	7s. 6d. + 18900
1353		189)25 11	10½ (£0 2s. 8½d. Ans.)
22		20	
20		511s.	
453s.		378	
369		133	
84		12	
12		1606d.	
1014d.		1512	
984		94	
30		4	
4		378f.	
123f.		378	
123			
(11)		(12)	
10)£2456	2s. 11d. ÷ 3650	354)£2348	11s. 4½d. (£6 12s. 8½d. Ans.)
365)245	12 8½ (£0 13s. 5½d. Ans.)	2124	
20		224	
4912s.		20	
365		4491s.	
1262		4248	
1095		243	
167		12	
12		2920d.	
2007d.		2832	
1825		88	
182		4	
4		354f.	
730f.		354	
730			

## Ex. 12. (p. 24.)

- (1) 10935 farthings ÷ 1215 farthings = 9. Ans.
- (2) 21870f. ÷ 3645f. = 6. Ans.
- (3) 98415f. ÷ 10935f. = 9. Ans.
- (4) 10935 three-hf. d. ÷ 405 three-hf. d. = 27. Ans.
- (5) 10935 three-hf. d. ÷ 1215 three-hf. d. = 9. Ans.
- (6) 196830f. ÷ 32805f. = 6. Ans.
- (7) 164250d. ÷ 18250d. = 9. Ans.



- (8)  $27375 \text{ three-hf. d.} \div 9125 \text{ three-hf. d.} = 3. \text{ Ans.}$   
 (9)  $9990 \text{ lbs.} \div 370 \text{ lbs.} = 27. \text{ Ans.}$   
 (10)  $12410640 \text{ in.} \div 90 \text{ in.} = 137896. \text{ Ans.}$   
 (11)  $9116 \text{ lbs.} \div 212 \text{ lbs.} = 43. \text{ Ans.}$   
 (12)  $56244 \text{ grs.} \div 129 \text{ grs.} = 436. \text{ Ans.}$   
 (13)  $164343 \text{ po.} \div 5667 \text{ po.} = 29. \text{ Ans.}$   
 (14)  $328686 \text{ po.} \div 5667 \text{ po.} = 58. \text{ Ans.}$   
 (15)  $7821 \text{ pks.} \div 99 \text{ pks.} = 79. \text{ Ans.}$   
 (16)  $378716 \text{ po.} \div 14566 \text{ po.} = 26. \text{ Ans.}$

## Ex. 13. (p. 25.)

- (1) 
$$\begin{array}{r} 835 \text{gu.} \\ 21 \overline{) 1753.5 \text{s.}} \\ \underline{\text{£}876 \text{ } 15 \text{s.}} \text{ Ans.} \end{array}$$
 
$$\begin{array}{r} \text{£}538 \\ 40 \overline{) 21520 \text{sixp.}} \\ \underline{1024 \text{hf. gu. \& } 16 \text{sixp. or } 8 \text{s.}} \text{ Ans.} \end{array}$$
- (2) 
$$\begin{array}{r} 760 \text{hf. crs.} \\ 5 \overline{) 3800 \text{sixp.}} \\ \underline{90 \text{gu. \& } 20 \text{sixp. or } 10 \text{s.}} \text{ Ans.} \end{array}$$
 
$$\begin{array}{r} 670 \text{hf. gu.} \\ 21 \overline{) 14070 \text{sixp.}} \\ \underline{2814 \text{hf. crs.}} \text{ Ans.} \end{array}$$
- (3) 
$$\begin{array}{r} 325 \text{crs.} \\ 10 \overline{) 3250 \text{sixp.}} \\ \underline{154 \text{hf. gu. \& } 16 \text{sixp. or } 8 \text{s.}} \text{ Ans.} \end{array}$$
 
$$\begin{array}{r} 253 \text{gu.} \\ 21 \overline{) 5313 \text{s.}} \\ \underline{1062 \text{crs. } 3 \text{s.}} \text{ Ans.} \end{array}$$
- (4) 
$$\begin{array}{r} 3)18756 \text{fourp.} \\ 5) \text{ } 6252 \text{s.} \\ \underline{1250 \text{crs. } 2 \text{s.}} \text{ Ans.} \end{array}$$
 
$$\begin{array}{r} 3700 \text{hf. crs.} \\ 30 \overline{) 111000 \text{d.}} \\ \underline{27750 \text{fourp.}} \text{ Ans.} \end{array}$$
- 5) 
$$\begin{array}{r} \text{£}36 \text{ } 3\frac{1}{2} \text{crs.} \\ 4 \overline{) 147 \text{crs. \& } 2 \text{s. } 6 \text{d.}} \text{ Ans.} \end{array}$$
 
$$\begin{array}{r} \text{£}27 \text{ } 10 \text{sixp. } 4 \text{d.} \\ 40 \overline{) 1090 \text{sixp. \& } 4 \text{d.}} \text{ Ans.} \end{array}$$
- (6) 
$$\begin{array}{r} 100 \text{hf. gu.} = 50 \text{gu.} \\ 21 \overline{) 1050 \text{s.}} \\ 3 \overline{) 3150 \text{fourp.}} \text{ Ans.} \end{array}$$
 
$$\begin{array}{r} \text{£}100 \\ 20 \overline{) 2000 \text{s.}} \\ 285 \text{sev. s. \& } 5 \text{s.} \text{ Ans.} \end{array}$$

# RECTANGULAR AREAS.

2

- )      114 lbs. Av.                      16 dwt.  
           7000                              24  
 24)798000 grs.                      2,0)38,4 grs.  
 2,0)3325,0 dwt.                      3)19 scr. 4 grs.  
       12)1662 oz. 10 dwt.                      6 drs. 1 scr. 4 grs. *Ans.*  
*Ans.* 138 lbs. 6 oz. 10 dwt.
- )      20 lbs. Av.                      5 drs. Ap.  
           7000                              3  
 24)140000 grs.                      15 scr.  
 2,0)583,3 dwt. 8 grs.                      20  
       12)291 oz. 13 dwt.                      24)300 grs.  
*Ans.* 24 lbs. 3 oz. 13 dwt 8 grs.                      12 dwt. 12 grs. *Ans.*
- )      478 ells  $\times$  5 qrs.  $\div$  4 qrs. = 597 yds. 2 qrs. *Ans.*  
       14 hands  $\times$  4 in.  $\div$  12 in. = 4 ft. 8 in. *Ans.*
- )      500 fath.  $\times$  2 yds. = 1000 yds. *Ans.*  
       5 fur.  $\times$  220 yds.  $\div$  2 yds. = 550 fath. *Ans.*

## Ex. 14. (p. 26.)

- )      446 in.                      (2)      276 in.  
           33 in.                              41 in.  
 144)14718 sq. in.                      144)11316 sq. in.  
       9)102 ft. 30 in.                      9)78 ft. 84 in.  
*Ans.* 11 sq. yds. 3 ft. 30 in.                      *Ans.* 8 sq. yds. 6 ft. 84 in.
- )      110 in.                      (4)      60 in.  
           36 in.                              37 in.  
 144)3960 sq. in.                      144)2220 sq. in.  
       9)27 ft. 72 in.                      9)15 ft. 60 in.  
*Ans.* 3 sq. yds. 72 in.                      *Ans.* 1 sq. yd. 6 ft. 60 in.
- )      187 in.                      (6)      269 in.  
           143 in.                              108 in.  
 144)26741 sq. in.                      144)29052 sq. in.  
       9)185 ft. 101 in.                      9)201 ft. 108 in.  
*Ans.* 20 sq. yds. 5 ft. 101 in.                      *Ans.* 22 sq. yds. 3 ft. 108 in.
- )      32 ft.                      (8)      26 ft.  
           16 ft.                              32 ft.  
       9)512 sq. ft.                      9)832 sq. ft.  
*Ans.* 56 sq. yds. 8 ft.                      *Ans.* 92 sq. yds. 4 ft.

- (9) 
$$\begin{array}{r} 67 \text{ in.} \\ 22 \text{ in.} \\ 144 \overline{)1474} \text{ sq. in.} \\ 9 \overline{)10} \text{ ft. 34 in.} \\ \text{Ans. } \underline{1 \text{ sq. yd. 1 ft. 34 in.}} \end{array}$$
- (10) 
$$\begin{array}{r} 560 \text{ in.} \\ 560 \text{ in.} \\ 144 \overline{)313600} \text{ sq. in.} \\ 9 \overline{)2177} \text{ ft. 112 in.} \\ \text{Ans. } \underline{241 \text{ sq. yds. 8 ft. 112 in.}} \end{array}$$
- (11) 
$$\begin{array}{r} (204 \text{ in.} + 151 \text{ in.}) \times 2 \\ = 710 \text{ in. circuit.} \\ 101 \text{ in. height.} \\ 144 \overline{)71710} \text{ sq. in.} \\ 9 \overline{)497} \text{ ft. 142 in.} \\ \text{Ans. } \underline{55 \text{ sq. yds. 2 ft. 142 in.}} \end{array}$$
- (12) 
$$\begin{array}{r} 219 \text{ in.} \times 4 \\ = 876 \text{ in. circuit.} \\ 102 \text{ in. height.} \\ 144 \overline{)89352} \text{ sq. in.} \\ 9 \overline{)620} \text{ ft. 72 in.} \\ \text{Ans. } \underline{68 \text{ sq. yds. 8 ft. 72 in.}} \end{array}$$

**Ex. 15.** (p. 27.)

- (1)  $7359 \text{ sq. in.} \div 223 \text{ in.} = 33 \text{ in.} = 2 \text{ ft. 9 in.}$  *Ans.*
- (2)  $14817 \text{ sq. in.} \div 33 \text{ in.} = 449 \text{ in.} = 12 \text{ yds. 1 ft. 5 in.}$  *Ans.*
- (3)  $11316 \text{ sq. in.} + 69 \text{ in.} = 164 \text{ in.} = 4 \text{ yds. 1 ft. 8 in.}$  *Ans.*
- (4)  $22632 \text{ sq. in.} + 276 \text{ in.} = 82 \text{ in.} = 2 \text{ yds. 10 in.}$  *Ans.*
- (5)  $22077 \text{ sq. in.} \div 669 \text{ in.} = 33 \text{ in.} = 2 \text{ ft. 9 in.}$  *Ans.*
- (6)  $54626 \text{ sq. in.} + 286 \text{ in.} = 191 \text{ in.} = 5 \text{ yds. 11 in.}$  *Ans.*
- (7)  $22451 \text{ sq. in.} + 143 \text{ in.} = 157 \text{ in.} = 13 \text{ ft. 1 in.}$  *Ans.*
- (8)  $885481 \text{ sq. in.} + 941 \text{ in.} = 941 \text{ in.}$ ; therefore the building is square.  
*Ans.*
- (9)  $26 \text{ ft.} \times 35 \text{ ft.} \times 144 = 131040 \text{ sq. in. of carpet;}$   
 $131040 \text{ sq. in.} \div 28 \text{ in.} = 4680 \text{ in.} = 130 \text{ yds.}$  *Ans.*
- (10)  $288 \text{ yds.} \times 32 \text{ in.} \div 27 \text{ in.} = 341 \text{ yds. 1 ft.}$  *Ans.*
- (11)  $225 \text{ in.} \times 225 \text{ in.} = 50625 \text{ sq. in. of matting;}$   
 $50625 \text{ sq. in.} \div 27 \text{ in.} = 1875 \text{ in.} = 52 \text{ yds. 3 in.}$  *Ans.*
- (12)  $225 \text{ in.} \times 4 = 900 \text{ in. circuit of room;}$   
 $900 \text{ in.} \times 160 \text{ in.} = 144000 \text{ sq. in. of paper;}$   
 $144000 \text{ sq. in.} \div 16 \text{ in.} = 9000 \text{ in.} = 250 \text{ yds.}$  *Ans.*

**Ex. 16.** (p. 29.)

- (1)  $225 \text{ in.} \times 160 \text{ in.} \times 100 \text{ in.} = 3600000 \text{ c. in.}$ ; which  $+ 1728$  and  $27$  gives  $77 \text{ c. yds. 4 ft. 576 in.}$  *Ans.*
- (2)  $45 \text{ in.} \times 80 \text{ in.} \times 25 \text{ in.} = 90000 \text{ c. in.} = 1 \text{ c. yd. 25 ft. 144 in.}$  *Ans.*

# MISCELLANEOUS EXAMPLES.

27

- (3)  $135 \text{ in.} \times 40 \text{ in.} \times 125 \text{ in.} = 675000 \text{ c. in.} = 14 \text{ c. yds. } 12 \text{ ft. } 1080 \text{ in.}$   
*Ans.*
- (4)  $180 \text{ in.} \times 240 \text{ in.} \times 50 \text{ in.} = 2160000 \text{ c. in.} = 46 \text{ c. yds. } 8 \text{ ft.}$  *Ans.*
- (5)  $88 \text{ in.} \times 180 \text{ in.} \times 99 \text{ in.} = 1568160 \text{ c. in.} = 33 \text{ c. yds. } 16 \text{ ft. } 964 \text{ in.}$   
*Ans.*
- (6)  $110 \text{ in.} \times 72 \text{ in.} \times 80 \text{ in.} = 633600 \text{ c. in.} = 13 \text{ c. yds. } 15 \text{ ft. } 1152 \text{ in.}$   
*Ans.*
- (7)  $36 \text{ in.} \times 36 \text{ in.} \times 34 \text{ in.} = 44064 \text{ c. in.} = 25 \text{ c. ft. } 864 \text{ in.}$  *Ans.*
- (8)  $240 \text{ in.} \times 36 \text{ in.} \times 30 \text{ in.} = 259200 \text{ c. in.} = 5 \text{ c. yds. } 15 \text{ ft.}$  *Ans.*
- (9)  $89 \text{ in.} \times 89 \text{ in.} \times 89 \text{ in.} = 704969 \text{ c. in.} = 15 \text{ c. yds. } 2 \text{ ft. } 1673 \text{ in.}$  *Ans.*
- (10)  $336 \text{ c. yds.} \div 144 \text{ sq. yds.} = 2 \text{ yds. } 1 \text{ ft.}$  *Ans.*
- (11)  $66 \text{ in.} \times 128 \text{ in.} = 8448 \text{ sq. in.};$   
 $7040 \times 12 \times 12 \times 12 \text{ c. in.} \div 8448 \text{ sq. in.}$   
 $= 7040 \times 144 \div 704 = 1440 \text{ in.} = 120 \text{ ft.}$  *Ans.*
- (12)  $10 \text{ mi.} \times 5280 \text{ ft.} \times 12 \text{ in.}$  is the length in inches;  
 $52800 \times 12 \times 87 \times 244 \text{ c. in.}$  of water, may be reduced to c. ft. by  
dividing by  $12 \times 12 \times 12$ , and is therefore  $= 4400 \times 29 \times 61$   
c. ft.  $= 7783600 \text{ c. ft.}$  *Ans.*

## MISCELLANEOUS EXAMPLES.

### Ex. 17. (p. 29.)

- (1)  $1 \text{ sov.} = 123 \text{ grs.} \therefore 1000 \text{ sovs.} = 123000 \text{ grs.} = 21 \text{ lb. } 4 \text{ oz.}$   
 $5 \text{ dwts.}$  *Ans.*
- (2)  $2551443 \text{ sec.} = 42524 \text{ min. } 3 \text{ sec.} = 708 \text{ hrs. } 44 \text{ min. } 3 \text{ sec.} = 29 \text{ da.}$   
 $12 \text{ hrs. \&c.}$  *Ans.*
- (3)  $132000000 \text{ ft.} = 44000000 \text{ yds.} = 200000 \text{ fur.} = 25000 \text{ mi.}$  *Ans.*
- (4)  $1 \text{ cub. yd.} = 27 \text{ cub. ft.,}$  and therefore weighs  $27000 \text{ oz.} = 1687 \text{ lbs.}$   
 $8 \text{ oz.} = 15 \text{ cwt. } 7 \text{ lbs. } 8 \text{ oz.}$  *Ans.*
- (5)  $8 \text{ min. } 13 \text{ sec.} = 493 \text{ sec.,}$  sun's distance  $= 192500 \text{ mi.} \times 493 =$   
 $94902500 \text{ mi.}$  *Ans.*
- (6)  $1907314 \text{ pennies} = \text{£}7947 \text{ 2s. } 10d.$  *Ans.*
- (7)  $3000 \text{ half-pennies} = 125s. \text{ per day.}$  amount in a year  $= 125s. \times$   
 $365 = \text{£}2281 \text{ 5s.}$  *Ans.*
- (8)  $31556928 \text{ sec.} \div (60 \times 60 \times 24) = 365. \text{ da. } 5 \text{ hrs. } 48 \text{ min. } 48 \text{ sec.}$   
*Ans.*
- (9)  $9000 \text{ b. c.} = 3000 \text{ inches} = 250 \text{ ft.}$  *Ans.*
- (10)  $\frac{1}{4} \text{ min.} = 15 \text{ sec.,}$  ball travels  $15000 \text{ ft.}$  in a quarter of a min.  
 $= 5000 \text{ yds.} = 2 \text{ mi. } 6 \text{ fur. } 160 \text{ yds.}$  *Ans.*
- (11)  $2240 \text{ lbs. in a ton} \times 200 = 448000 \text{ lbs.}$   
 $\therefore 448081 \text{ lbs.} \times 7d. = 3136567d. = \text{£}13069 \text{ 0s. } 7d.$  *Ans.*

- (12)  $1130 \text{ ft.} \times 7 = 7910 \text{ ft.} = 1 \text{ mi. } 3 \text{ fur. } 216 \text{ yds. } 2 \text{ ft.}$  *Ans.*
- (13)  $100000 \text{ lbs.} + (28 \times 4 \times 20) = 44 \text{ t. } 12 \text{ cwt. } 3 \text{ qrs. } 12 \text{ lbs.}$  *Ans.*
- (14)  $\text{£}1779 \text{ 4s. } 3\frac{3}{4}\text{d.} + 81 = \text{£}21 \text{ 19s. } 3\frac{3}{4}\text{d.}$  *Ans.*
- (15) Value of the talent  $= 7\frac{3}{4}\text{d.} \times 6000 = 31\text{d.} \times 1500 = 46500\text{d.} = \text{£}193 \text{ 15s.}$  *Ans.*  
 $46500\text{d.} \div 775\text{d.} = 9300 \div 155 = 1860 \div 31 = 60 \text{ minæ.}$  *Ans.*
- (16)  $\text{£}97 \text{ 9s. } 6\text{d.} \div 6 = \text{£}16 \text{ 4s. } 11\text{d.}$  *Ans.*
- (17)  $5\text{d.} \times 11800$  is daily realised; which  $\times 6 \text{ da.} \times 4 \text{ wks.} \times 6 \text{ mths.}$ , and then  $+12$  and  $20$  to reduce pence to  $\text{£}$ , we have  

$$\frac{\text{£}5 \times 11800 \times 6 \times 4 \times 6}{12 \times 20} = \text{£}11800 \times 3 = \text{£}35400.$$
 *Ans.*
- (18)  $\text{£}1500 \times 15 = \text{£}22500 \text{ 0s. } 0\text{d.}$   
 $\text{£}825 \text{ 18 } 9 \times 15 = \text{£}12389 \text{ 1s. } 3\text{d.}$  *Ans.*  
 $\text{£}10110 \text{ 18s. } 9\text{d.}$  *Ans.*
- (19)  $1000000 \div 100 = 10000 \text{ min.} = 6 \text{ da. } 22 \text{ hrs. } 40 \text{ min.}$  *Ans.*
- (20)  $3 \text{ ft.} \times 1760 \times 240000$  is the distance in feet; and this  $\div 1000 = 3 \times 1760 \times 240 \text{ sec.} = 3 \times 1760 \times 4 \text{ min.} = 176 \times 2 \text{ hrs.} = 352 \text{ hrs.} = 14 \text{ da. } 16 \text{ hrs.}$  *Ans.*
- (21)  $(30\text{d.} + 12\text{d.} + 1\text{d.} + \frac{1}{4}\text{d.}) \times 2500 = 43\frac{1}{4}\text{d.} \times 2500$  the sum coined in an hour; which  $\times 24 \text{ hrs.} \times 6 \text{ da.}$  give  $173\text{d.} \times 2500 \times 36 = 173\text{d.} \times 10000 \times 9 = 15570000\text{d.} = \text{£}64875.$  *Ans.*
- (22)  $7\text{s. } 6\text{d.}$ , or  $90\text{d.} \times 530 = 47700\text{d.} = \text{£}198 \text{ 15s.}$  *Ans.*
- (23)  $3587 \text{ yds. } 0 \text{ ft. } 9 \text{ in.} \div (9 \times 3) = 132 \text{ yds. } 2 \text{ ft. } 7 \text{ in.}$  *Ans.*
- (24) Weight of a talent  $= 219 \text{ grs.} \times 3000 = 657000 \text{ grs.} = 114 \text{ lbs. } 15 \text{ dwts.}$  *Ans.*  
 Value of ditto  $= 27\frac{1}{2}\text{d.} \times 3000 = 55\text{d.} \times 1500$ ; value of 10000 talents  $= 55\text{d.} \times 15000000 = 825000000\text{d.} = \text{£}3437500.$  *Ans.*
- (25)  $\text{£}3 \text{ 14s. } 8\text{d.} \times 6 \times 7 = \text{£}156 \text{ 16s.}$  *Ans.*
- (26)  $6 \text{ gall. at } 12/6 = 75\text{s. } 0\text{d.}$   
 $8 \text{ " } 18/9 = 75 \text{ 0}$   
 $10 \text{ " } 22/8 = 226 \text{ 8}$   
 $20 \text{ gall. worth } 376\text{s. } 8\text{d.}$   
 $\therefore 1 \text{ gall. worth } 18\text{s. } 10\text{d.}$  *Ans.*
- (27) 27 times  $\text{£}14 \text{ 6s. } 8\frac{1}{2}\text{d.} = \text{£}387 \text{ 1s. } 1\frac{1}{2}\text{d.}$  *Ans.*
- (28) 2 cwt. 1 lb. or 225 lbs. cost  $2339\text{s. } 0\frac{3}{4}\text{d.}$   
 $\therefore 45 \text{ lbs. cost } 467\text{s. } 9\frac{3}{4}\text{d.}$   
 $9 \text{ lbs. cost } 93\text{s. } 6\frac{3}{4}\text{d.}$   
 $1 \text{ lb. cost } 10\text{s. } 4\frac{3}{4}\text{d.}$  *Ans.*
- (29)  $\text{£}231 \text{ 16s. } \div 4\text{s. } 9\text{d.} = 4636 \times 12\text{d.} \div 57\text{d.} = 4636 \times 4 \div 19 = 244 \times 4 = 976 \text{ ducats.}$  *Ans.*
- (30)  $2 \text{ qrs. at } 39\text{s. a qr.} = 78\text{s. } 0\text{d.}$   
 $7 \text{ bu. at } 6\text{s. a bu.} = 42 \text{ 0}$   
 Proposed gain  $23 \text{ 9}$   
 $2 \text{ qrs. } 7 \text{ bu., or } 23 \text{ bu. to be sold for } 143\text{s. } 9\text{d.}$   
 or  $1 \text{ bu. to be sold for } 6\text{s. } 3\text{d.}$  *Ans.*

- (31) A gains  $1\frac{3}{4}$  hrs. per day, or  $1\frac{3}{4}$  hrs.  $\times 365\frac{1}{4}$  per annum, or  $1\frac{3}{4} \times 365\frac{1}{4} \times 40$  hrs. in 40 years.  
Reducing these hours to years, by dividing by 24 and  $365\frac{1}{4}$ , we have  $1\frac{3}{4} \times 40 \div 24$ , or  $7 \times 10 \div 24 = 35$  yrs.  $\div 12 = 2$  yrs. and one-twelfth of 11 years.  
Now, one-twelfth of 11 years is  $= 365$  da. 6 hrs.  $\times 11 \div 12 = 334$  da. 19 hrs. 30 min.;  
 $\therefore$  the *Ans.* is 2 yrs. 334 da. 19 hrs. 30 min.
- (32) 5 oz. produce  $2\frac{1}{2}$  furlongs;  $\therefore 2$  oz. produce 1 furlong, or 16 oz produce 8 furlongs, i.e. 1 lb. yields 1 mile;  $\therefore$  for 100 miles there will be required 100 lbs.  $= 3$  qrs. 16 lbs. *Ans.*
- (33)  $1478 \text{ 12s. } 9\frac{3}{4}d. \div 77 = \text{£}19 \text{ 4s. } 0\frac{3}{4}d. \text{ Ans.}$
- (34)  $23\frac{3}{4}d. \times 100000 = 9500000f. = \text{£}9895 \text{ 16s. } 8d. \text{ Ans.}$   
 $27d. \times 100000 = 2700000d. = \text{£}11250. \text{ Ans.}$
- (35) 770 sq. ft.  $\times 770$  and 670 sq. ft.  $\times 670$ , are the two areas.  
To reduce these to acres we divide in each case by  $9 \times 4840$ .  
 $592900 \text{ sq. ft.} = 13 \text{ ac. } 2957 \text{ sq. yds. } 7 \text{ ft. } \text{Ans.}$   
 $448900 \text{ sq. ft.} = 10 \text{ ac. } 1477 \text{ sq. yds. } 7 \text{ ft. } \text{Ans.}$
- (36)  $\text{£}1 \text{ 19s. } 9d. \times 143 = \text{£}284 \text{ 4s. } 3d.$   
 $\text{£}16 \text{ 16s. } 0d. \times 16 = 268 \text{ 16 } 0$   
 $\text{£}15 \text{ 8s. } 3d. \text{ Ans.}$
- (37)  $\text{£}21 + 6s. \text{ 8d.} = \text{£}63 \div 20s. = \text{£}63 \div \text{£}1 = 63 \text{ yds. } \text{Ans.}$
- (38)  $1000000 \text{ oz.} = 62500 \text{ lbs. } \text{Ans.}$   
 $1000000d. = \text{£}4166 \text{ 13s. } 4d. \text{ Ans.}$
- (39) 36 hrs  $= 2160$  min.; in which time he counted 216000s.;  $\therefore 300000 - 216000 = 84000$  not counted;  $84000f. = 21000d. = \text{£}87. \text{ 10s. } \text{Ans.}$
- (40)  $\text{£}60 \text{ 15s. } 6d. \div \text{£}4 \text{ 13s. } 6d. = 2431 \text{ sixp.} \div 187 \text{ sixp.} = 13. \text{ Ans.}$
- (41) 20 bricklayers at 27s.  $= \text{£}27 \text{ 0s.}$   
10 carpenters at 29s.  $= 14 \text{ 10}$   
Amt. per week  $\text{£}41 \text{ 10}$   
 $\times 4 \text{ wks.} \times 4 \text{ mo.} = \text{£}664. \text{ Ans.}$
- (42) 12 mi.  $= 5280 \text{ ft.} \times 12$ . Now, if we multiply the three dimensions together, we shall have cub. ft., which will be converted to oz. by multiplying by 1000.  
 $5280 \times 12 \times 25 \times 8 \times 1000 \text{ oz.} = 330 \times 2400000 \text{ lbs.} = 792000000 \text{ lbs.} = 353571 \text{ t. } 8 \text{ cwt. } 2 \text{ qrs. } 8 \text{ lb. } \text{Ans.}$
- (43) In every 55 yds. the gain is 5 ft. Now, half a mile is 880 yds.; and hence, when the faster boat has run half a mile, it will be ahead of the other by  $(880 \text{ yds.} \div 55 \text{ yds.}) \times 5 \text{ ft.} = 80 \text{ ft.} = 26 \text{ yds. } 2 \text{ ft. } \text{Ans.}$
- (44)  $16750 \text{ shekels at } 2s. \text{ 8}\frac{1}{2}d. = 16750 \times 27\frac{1}{2}d. = \text{£}1919 \text{ 5s. } 5d. \text{ Ans.}$

- (45) By one revolution the wheel passes over  $16\frac{1}{2}$  ft.; and we have to find by how many revolutions it will pass over 3 ft.  $\times 1760 \times 52$ .  

$$\frac{3 \times 1760 \times 52}{16\frac{1}{2}} = \frac{3 \times 1760 \times 104}{33} = 160 \times 104 = 16640. \text{ Ans.}$$
- (46) £161 17s. 6d.  $\div$  £4 7s. 6d. = 1295 *hf. crs.*  $\div$  35 *hf. crs.* = 37 oz. *Ans.*
- (47) 5 men and 6 women = 15 women + 6 women = 21 women.  
 Amount of 21 women's shares = £115 10s.  
 Ditto of 3 ditto, = £16 10s. = a man's share. } *Ans.*  
 Ditto of 1 ditto, = £5 10s. = a woman's ditto. }
- (48) 20 ft. 6 in. = 246 in.; and 4 ft. 3 in. = 51 inches; 246 in. by 1 in. = 246 sq. in.  $\therefore$  246 in. by 51 in. = 246 sq. in.  $\times$  51 = 12546 sq. in. = 9 sq. yds. 6 ft. 18 in. *Ans.*
- (49) Original excess of A above B  
 = £100 4s.  $11\frac{1}{2}$ d. - £67 1s.  $6\frac{1}{2}$ d. = £33 3s.  $5\frac{1}{2}$ d.  
 Now, A gives £11 11s.  $11\frac{1}{2}$ d., and gets £11 11s.  $5\frac{3}{4}$ d.; hence he loses  $5\frac{1}{2}$ d.; which makes his excess over B less by  $5\frac{1}{2}$ d.  $\times 2 = 11$ d.  
 $\therefore$  £33 3s.  $5\frac{1}{2}$ d. - 11d. = £33 2s.  $6\frac{1}{2}$ d. *Ans.*
- (50)  $44\frac{3}{4}$ d.  $\times 20 \times 3 \times 2 = 44\frac{3}{4}$ d.  $\times 4 \times 30 = 179d. \times 30 = 5370d. = £227s. 6d$   
*Ans.*
- (51)  $165s. \div 6 (1s. 4d. + 10d. + 4d.) = 165s. \div 15s. = 11. \text{ Ans.}$
- (52)  $\frac{96 \times 70}{2\frac{1}{2}} \text{ ft.} = \frac{192 \times 70}{5 \times 3} \text{ yds.} = 64 \times 14 = 896 \text{ yds. Ans.}$
- (53) 344215 cwt. 3 qrs. 23 lb. 8 oz.  $\div$  215000 = 1 cwt. 2 qrs. 11 lbs. 5 oz. *Ans.*
- (54)  $300 \times 22 \times 50 \times 22 \times 30 \times 22 \text{ c. in.} = 4791600000 \text{ c. in.} = 102700 \text{ c. yds. 16 ft. 1152 in. Ans.}$
- (55) Setting aside £3 15s. for the excess of the greatest share, we have £11 5s. to be divided into 3 equal shares;  
 $\therefore$  each lower share = £3 15s. *Ans.*  

$$\begin{array}{r} 3 \text{ } 15 \\ \hline \end{array}$$
  
 and the greatest share = £7 10 *Ans.*
- (56) £5629 10s. + £8 13s. 9d. = £22518  $\div$  £34 15s. = 90072  $\div$  139 = 648 patients. *Ans.*
- (57) The inner square is 220 sq. yds. by 220, which, reduced to acres, is  $\frac{220 \times 220}{4840} = 10 \text{ ac. Ans.}$   
 $252 \times 252 - 220 \times 220 = 15104 \text{ sq. yds. plantation} = 3 \text{ ac. 584 yds. Ans.}$
- (58) £26357 9s.  $10\frac{1}{2}$ d. +  $1\frac{1}{2}$ d. = £210859 19 + 1s. = 4217199 lbs. = 1882 tons 13 cwt. 2 qrs. 7 lbs. *Ans.*
- (59) He mixes the sugars in the proportion of 1 to 2;  

$$\begin{array}{r} 1 \text{ lb. at } 11d. = 11d. \\ 2 \text{ lbs. at } 5d. = 10 \\ \hline 3 \text{ lbs. to be sold for } 21d.; \text{ or } 1 \text{ lb. for } 7d. \text{ Ans.} \end{array}$$

- (60) This question asks, how often  $21s. + 10\frac{1}{2}s. + 5s. + 2\frac{1}{2}s.$  is contained in  $780s.$ ;  $\therefore 780s. \div 39s. = 20.$  *Ans.*
- (61) 31 nights at  $1s. 8d. = 20d. \times 31 = 620d. = £2\ 11s. 8d.$ ;  
 $\therefore £3 - £2\ 11s. 8d. = 8s. 4d.$  *Ans.*
- (62)  $58\ ft. 6\ in. \text{ by } 54\ ft. 9\ in. = 702\ sq. in. \times 657 = 461214\ sq. in. = 355\ sq. yds. 7ft. 126\ in. *Ans.*$
- (63)  $2\frac{3}{4}d. \times 60\ yds. \times 6\ pie. \times 6\ par. \times 6\ packs; = 2\frac{3}{4}s. \times 5 \times 6 \times 36 = 11s. \times 30 \times 9 = 2970s. = £148\ 10s. *Ans.*$
- (64)  $£5\ 2s. 11d. \div 52 = 1s. 11\frac{3}{4}d. *Ans.*$
- (65)  $500\ \text{times } £1\ 18s. 6d. \div 2s. 6d. = 500\ \text{times } £7\ 14s. + 10s. = 50\ \text{times } 154 = 7700. *Ans.*$
- (66)  $235\ in. \text{ by } 225\ in. + 25\ in. = \frac{235\ sq. in. \times 225}{25\ in.} = 235\ in. \times 9.$   
 $= 235 \div 4\ yds. = 58\frac{3}{4}\ yds. *Ans.*$
- (67)  $4\ \text{men} = 8\ \text{women} = 24\ \text{children}.$   
 $6\ \text{women} = 18\ \text{ditto}.$   
 $8\ \text{ditto}.$   
 $£550\ 3s. 1\frac{1}{2}d. \text{ divided into } 50\ \text{children's shares}$   
 $\left. \begin{array}{l} \text{gives } £11\ 0s. 0\frac{3}{4}d. \text{ each child} \\ \times 3 = £33\ 0s. 2\frac{1}{4}d. \text{ each wom.} \\ \times 2 = £66\ 0s. 4\frac{1}{2}d. \text{ each man.} \end{array} \right\} \text{Ans.}$
- (68)  $100\ lbs. \text{ per sec.} \times 60\ \text{sec.} \times 60\ \text{min.} \times 10\ \text{hrs.} = 3600000\ lbs. \text{ per day;}$   
 $\text{which } \div (28 \times 4 \times 20) \text{ gives } 1607\ \text{tons } 2\ \text{cwt. } 3\ \text{qrs. } 12\ lbs. *Ans.*$
- (69)  $150\ \text{min. at } 75\ \text{steps per min., or } 30\ \text{min. at } 375$   
 $+ 30\ \text{min. at } 108$   
 $= 30\ \text{min. at } 483$   
 $32\ in. \times 483 \times 30 = 8\ ft. \times 483 \times 10 = 8\ yds. \times 1610$   
 $= 12880\ yds. = 7\ mi. 2\ fur. 120\ yds. *Ans.*$
- (70)  $8500 + 1000 = 8\frac{1}{2}\ \text{thousand letters.}$   
 $8\ \text{thousand at } 5\frac{1}{2}d. = 3s. 8d.$   
 $\frac{1}{2}\ \text{a thous. at } 5\frac{1}{2}d. = 0\ 2\frac{3}{4}$   
 $\text{He earns per day } 3\ 10\frac{3}{4}d.$   
 $= 23s. 4\frac{1}{2}d. \text{ per week.} *Ans.*$
- (71) The difference in the amounts of 9508 persons at  $3s.$ , and 37431 persons at  $1s.$  is  $= 37431s. - 28524s. = 8907s. = £445\ 7s.$  gain  
*Ans.*
- (72)  $(6s. 7d. + 3s. 11d. + 2s. 10d.) \times \text{the number of bushels of each is to amount to } £500;$   
 $\therefore £500 \div 13s. 4d. = £1500 \div £2 = 750\ bu. *Ans.*$
- (73)  $\begin{array}{r} £\ s.\ d. \\ 184\ 11\ 2\frac{1}{4} \div 39 = £4\ 14s. 7\frac{3}{4}d. \text{ each. } \text{Ans.} \\ 70\ 19\ 8\frac{1}{4} \\ \hline 21)113\ 11\ 6 \\ \underline{210\ 8\ 2} \text{ Ans.} \end{array}$



(74)  $15 \times 36 \times 7 \times 12 \times 13$  c. in. in all.

$6 \times 12 \times 4 \times 12 \times 13$  c. in. in doorway.

- Diff.  $= (15 \times 36 \times 7 - 6 \times 12 \times 4) \times 12 \times 13 = 3492 \times 12 \times 13$  c. in. of brickwork. Therefore, as each brick is 108 c. in. the whole number of bricks is

$$\frac{3492 \times 12 \times 13}{108} = 388 \times 13 = 5044. \text{ Ans.}$$

	£	s.	d.
(75) First year's produce per ac., 18 bu. at 8s.	.	7	4 0
Cost per acre . . . . .	.	6	14 6
Gross profit per acre . . . . .	.	0	9 6
Tithes = produce of 50 ac. at £7 4s.	.	360	0 0
Gross profit on 500 ac. at 9s. 6d.	.	237	10 0
Ans. Loss by one year . . . . .	£	122	10 0
First year's produce per. ac. 18 bu. at 8s.	.	7	4 0
Second " " 25 bu. at 4s.	.	5	0 0
Third " " 100 bags at 3s.	.	15	0 0
		£	27 4 0
Cost £6 14s. 6d. + £3 16s. + £12 11s. 2d.	.	23	1 8
Gross profit per ac. . . . .	.	4	2 4
Gross profit on 500 ac. at 82s. 4d.	.	2058	6 8
Tithes = produce of 50 ac. at £27 4s.	.	1360	0 0
Ans. Nett profit in three years .	£	698	6 8

## CHAPTER II.

GREATEST COMMON MEASURE: LEAST COMMON  
MULTIPLE.

## Ex. 18. (p. 35.)

\* In finding the G.C.M., it economises space to write the several remainders under the first divisor; and when the quotient No. is 1, the subtrahend need not be brought down. This has been observed in the following examples:

$$\begin{array}{r} (1) \\ 224 \overline{)336} (1 \\ 112 \overline{)224} (2 \end{array}$$

$$\begin{array}{r} (2) \\ 348 \overline{)1024} (2 \\ 696 \\ 328 \overline{)348} (1 \\ 20 \overline{)328} (16 \\ 320 \\ 8 \overline{)20} (2 \\ 16 \\ 4 \overline{)8} (2 \end{array}$$

$$\begin{array}{r} (3) \\ 175 \overline{)2042} (11 \\ 1925 \\ 117 \overline{)175} (1 \\ 58 \overline{)117} (2 \\ 116 \\ 1 \overline{)58} (58 \end{array}$$

$$\begin{array}{r} (4) \\ 625 \overline{)1225} (1 \\ 600 \overline{)625} (1 \\ 25 \overline{)600} (24 \end{array}$$

$$\begin{array}{r} (5) \\ 1313 \overline{)2121} (1 \\ 808 \overline{)1313} (1 \\ 505 \overline{)808} (1 \\ 303 \overline{)505} (1 \\ 202 \overline{)303} (1 \\ 101 \overline{)202} (2 \end{array}$$

$$\begin{array}{r} (6) \\ 429 \overline{)715} (1 \\ 286 \overline{)429} (1 \\ 143 \overline{)286} (2 \end{array}$$

$$\begin{array}{r} (7) \\ 377 \overline{)1131} (3 \end{array}$$

$$\begin{array}{r} (8) \\ 770 \overline{)2431} (3 \\ 2310 \\ 121 \overline{)770} (6 \\ 726 \\ 44 \overline{)121} (2 \\ 88 \\ 33 \overline{)44} (1 \\ 11 \overline{)33} (3 \end{array}$$

$$\begin{array}{r} (9) \\ 900 \overline{)3474} (3 \\ 2700 \\ 774 \overline{)900} (1 \\ 126 \overline{)774} (6 \\ 756 \\ 18 \overline{)126} (7 \end{array}$$

$$\begin{array}{r} (10) \\ 1379 \overline{)2401} (1 \\ 1022 \overline{)1379} (1 \\ 357 \overline{)1022} (2 \\ 714 \\ 308 \overline{)357} (1 \\ 49 \overline{)308} (6 \\ 294 \\ 14 \overline{)49} (3 \\ 42 \\ 7 \overline{)14} (2 \end{array}$$

KEY TO COLENZO'S ARITHMETIC.

$$\begin{array}{r} (11) \\ 3721 \overline{)1} \\ 2314 \overline{)1} \\ 1407 \overline{)1} \\ 907 \overline{)1} \\ 7500 \overline{)1} \\ 3407 \overline{)4} \\ 372 \\ 3593 \overline{)2} \\ 70 \\ 2335 \overline{)1} \\ 1223 \overline{)1} \\ 1112 \overline{)1} \\ 1 \end{array}$$

$$\begin{array}{r} (12) \\ 7392 \overline{)1} \\ 7007 \overline{)18} \\ 6930 \\ 7385 \overline{)5} \end{array}$$

$$\begin{array}{r} (13) \\ 2793 \overline{)1} \\ 2660 \overline{)20} \end{array}$$

$$\begin{array}{r} (14) \\ 4165 \overline{)6} \\ 4116 \\ 9686 \overline{)14} \end{array}$$

$$\begin{array}{r} (15) \\ 5325 \overline{)8307} \overline{)1} \\ 2982 \overline{)5325} \overline{)1} \\ 2343 \overline{)2982} \overline{)1} \\ 639 \overline{)2343} \overline{)3} \\ 1917 \\ 426 \overline{)639} \overline{)1} \\ 213 \overline{)426} \overline{)2} \end{array}$$

$$\begin{array}{r} (16) \\ 3775 \overline{)10000} \overline{)2} \\ 7550 \\ 2450 \overline{)3775} \overline{)1} \\ 1325 \overline{)2450} \overline{)1} \\ 1125 \overline{)1325} \overline{)1} \\ 200 \overline{)1125} \overline{)5} \\ 1000 \\ 125 \overline{)200} \overline{)1} \\ 75 \overline{)125} \overline{)1} \\ 50 \overline{)75} \overline{)1} \\ 25 \overline{)50} \overline{)2} \end{array}$$

$$\begin{array}{r} (17) \\ 7056 \overline{)7392} \overline{)1} \\ 336 \overline{)7056} \overline{)21} \end{array}$$

$$\begin{array}{r} (18) \\ 6327 \overline{)23997} \overline{)3} \\ 18981 \\ 5016 \overline{)6327} \overline{)1} \\ 1311 \overline{)5016} \overline{)3} \\ 3933 \\ 1083 \overline{)1311} \overline{)1} \\ 228 \overline{)1083} \overline{)4} \\ 912 \\ 171 \overline{)228} \overline{)1} \\ 57 \overline{)171} \overline{)3} \end{array}$$

$$\begin{array}{r} (19) \\ 12321 \overline{)54345} \overline{)4} \\ 49284 \\ 5061 \overline{)12321} \overline{)2} \\ 10122 \\ 2199 \overline{)5061} \overline{)2} \\ 4398 \\ 663 \overline{)2199} \overline{)3} \\ 1989 \\ 210 \overline{)663} \overline{)3} \\ 630 \\ 33 \overline{)210} \overline{)6} \\ 198 \\ 12 \overline{)33} \overline{)2} \\ 24 \\ 9 \overline{)12} \overline{)1} \\ 9 \\ 3 \overline{)9} \overline{)3} \end{array}$$

$$\begin{array}{r} (20) \\ 4155 \overline{)24720} \overline{)5} \\ 20775 \\ 3945 \overline{)4155} \overline{)1} \\ 210 \overline{)3945} \overline{)18} \\ 3780 \\ 165 \overline{)210} \overline{)1} \\ 45 \overline{)165} \overline{)3} \\ 135 \\ 30 \overline{)45} \overline{)1} \\ 15 \overline{)30} \overline{)2} \end{array}$$

## Ex. 19. (p. 37.)

$$\begin{array}{r} (1) \\ 15 \overline{) 15.20} \\ 15 \times 1.4 \\ \hline = 60 \end{array}$$

$$\begin{array}{r} (3) \\ 3 \overline{) 4.16} \\ 3 \times 1.6 \\ \hline = 16 \end{array}$$

$$\begin{array}{r} (5) \\ 12 \overline{) 12.15.16} \\ 12 \times 1.5.4 = 240 \end{array}$$

$$\begin{array}{r} (6) \\ 16 \overline{) 3.16.20} \\ 16 \times 1.5 = 80 \end{array}$$

$$\begin{array}{r} (7) \\ 20 \overline{) 3.15.18.20} \\ 20 \times 3.9.1 = 180 \end{array}$$

$$\begin{array}{r} (8) \\ 12 \overline{) 16.3.12.18} \\ 12 \times 4.1.3 = 144 \end{array}$$

$$\begin{array}{r} (9) \\ 12 \overline{) 8.12.15.20} \\ 12 \times 2.1.5.3 = 120 \end{array}$$

$$\begin{array}{r} (10) \\ 3 \overline{) 4.68.17.2} = 68 \end{array}$$

$$\begin{array}{r} (11) \\ 6 \overline{) 3.12.16.18.24} \\ 6 \times 8.3.4 \\ \hline = 144 \end{array}$$

$$\begin{array}{r} (12) \\ 9 \overline{) 3.12.18.24.27} \\ 9 \times 3.4.3 = 216 \end{array}$$

$$\begin{array}{r} (13) \\ 2 \overline{) 3.4.3.10.48} \\ 2 \times 5.24 = 240 \end{array}$$

$$\begin{array}{r} (14) \\ 6 \overline{) 3.3.4.5.6.7.8.9} \\ 6 \times 5.1.7.4.3 = 2520 \end{array}$$

$$\begin{array}{r} (15) \\ 15 \overline{) 7.12.15.27.35.40.45} \\ 15 \times 4.9.7.8.3 \\ \hline = 7560 \end{array}$$

$$\begin{array}{r} (16) \\ 9 \overline{) 3.16.42.63.27.14.72} \\ 2 \overline{) 16.14.7.8} \\ 18 \times 8.7 = 1008 \end{array}$$

$$\begin{array}{r} (17) \\ 9 \overline{) 4.3.10.15.18.20.21} \\ 9 \times 5.2.20.7 \\ \hline = 1260 \end{array}$$

$$\begin{array}{r} (18) \\ 20 \overline{) 7.15.21.28.35.100.125} \\ 20 \times 3.21.7.7.5.25 \\ \hline = 10500 \end{array}$$

$$\begin{array}{r} (19) \\ 15 \overline{) 3.9.10.12.25.32.75.80} \\ 15 \times 3.4.32.5.16 \\ \hline = 7200 \end{array}$$

$$\begin{array}{r} (20) \\ 30 \overline{) 3.16.18.20.24.25.27.30} \\ 30 \times 8.2.2.4.5.9.1 \\ \hline = 10800 \end{array}$$

## CHAPTER III.

## VULGAR FRACTIONS.

## Ex. 20. (p. 39.)

$$(1) \quad 8 = \frac{8 \times 5}{5} = \frac{40}{5} \text{ Ans.} \quad 8 = \frac{8 \times 27}{27} = \frac{216}{27} \text{ Ans.}$$

$$27 = \frac{27 \times 5}{5} = \frac{135}{5} \text{ Ans.} \quad 27 = \frac{27 \times 27}{27} = \frac{729}{27} \text{ Ans.}$$

$$(2) \quad 34 = \frac{34 \times 11}{11} = \frac{374}{11} \text{ Ans.} \quad 34 = \frac{34 \times 17}{17} = \frac{578}{17} \text{ Ans.}$$

$$135 = \frac{135 \times 11}{11} = \frac{1485}{11} \text{ Ans.} \quad 135 = \frac{135 \times 17}{17} = \frac{2295}{17} \text{ Ans.}$$

$$(3) \quad 6 = \frac{6 \times 15}{15} = \frac{90}{15} \text{ Ans.} \quad 9 = \frac{9 \times 15}{15} = \frac{135}{15} \text{ Ans.}$$

$$12 = \frac{12 \times 15}{15} = \frac{180}{15} \text{ Ans.} \quad 20 = \frac{20 \times 15}{15} = \frac{300}{15} \text{ Ans.}$$

$$(4) \quad 25 = \frac{25 \times 34}{34} = \frac{850}{34} \text{ Ans.} \quad 34 = \frac{34 \times 34}{34} = \frac{1156}{34} \text{ Ans.}$$

$$70 = \frac{70 \times 34}{34} = \frac{2380}{34} \text{ Ans.} \quad 111 = \frac{111 \times 34}{34} = \frac{3774}{34} \text{ Ans.}$$

## Ex. 21. (p. 39.)

$$(1) \quad 3\frac{5}{7} = 3 + \frac{5}{7}; \text{ and } 3 = \frac{3 \times 7}{7} = \frac{21}{7}; \therefore 3 + \frac{5}{7} = \frac{21}{7} + \frac{5}{7} = \frac{26}{7} \text{ Ans.}$$

$$(2) \quad 10\frac{2}{9} = 10 + \frac{2}{9}; \text{ and } 10 = \frac{10 \times 9}{9} = \frac{90}{9}; \therefore 10 + \frac{2}{9} = \frac{90}{9} + \frac{2}{9} = \frac{92}{9} \text{ Ans.}$$

$$(3) \quad 221\frac{4}{11} = \frac{221 \times 11 + 4}{11} = \frac{2435}{11} \text{ Ans.}$$

$$(4) \quad 13\frac{15}{17} = \frac{13 \times 17 + 15}{17} = \frac{236}{17} \text{ Ans.} \quad (5) \quad \frac{427}{13} \text{ Ans.}$$

$$(6) \quad \frac{10027}{50} \quad (7) \quad \frac{863}{12} \quad (8) \quad \frac{1738}{15} \quad (9) \quad \frac{2315}{18} \quad (10) \quad \frac{1384}{37}$$

$$(11) \quad \frac{6029}{30} \quad (12) \quad \frac{3149}{25} \quad (13) \quad \frac{8229}{16} \quad (14) \quad \frac{2131}{21} \quad (15) \quad \frac{8639}{12}$$

$$(16) \frac{228}{115} \quad (17) \frac{4264}{239} \quad (18) \frac{3813}{360} \quad (19) \frac{12421}{111} \quad (20) \frac{8500}{99}$$


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**Ex. 22.** (p. 40.)

$$\begin{aligned} (1) \quad \frac{37}{9} &= 37 \div 9 = 4\frac{1}{9} \quad \text{Ans.} & (2) \quad \frac{79}{11} &= 79 \div 11 = 7\frac{2}{11} \quad \text{Ans.} \\ (3) \quad 24\frac{1}{13} & & (4) \quad 130. & & (5) \quad 29\frac{8}{35} & & (6) \quad 72\frac{31}{43} & & (7) \quad 22. \\ (8) \quad 25\frac{46}{87} & & (9) \quad 16\frac{15}{77} & & (10) \quad 33\frac{1}{95} & & (11) \quad 40. & & (12) \quad 35\frac{7}{102}. \\ (13) \quad 35\frac{53}{117} & & (14) \quad 21. & & (15) \quad 25\frac{85}{122} & & (16) \quad 16. & & (17) \quad 15\frac{79}{357}. \\ (18) \quad 16\frac{140}{401} & & (19) \quad 61\frac{121}{200} & & (20) \quad 70\frac{128}{333} \end{aligned}$$


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**Ex. 23.** (p. 41.)

$$\begin{aligned} (1) \quad \frac{35}{36} \times 9 &= \frac{35}{36 \div 9} = \frac{35}{4} = 8\frac{3}{4} \quad \text{Ans.} & \text{Similarly, } \frac{35}{36} \times 12 \\ &= \frac{35}{3} = 11\frac{2}{3} \quad \text{Ans.}, & \text{and } \frac{35}{36} \times 18 = \frac{35}{2} = 17\frac{1}{2} \quad \text{Ans.} \\ \frac{35}{36} \times 25 &= \frac{35 \times 25}{36} = \frac{875}{36} = 24\frac{11}{36} \quad \text{Ans.} \\ \frac{35}{36} \div 5 &= \frac{35 \div 5}{36} = \frac{7}{36} \quad \text{Ans.} & \text{Similarly, } \frac{35}{36} \div 7 = \frac{5}{36} \quad \text{Ans.} \\ \frac{35}{36} \div 8 &= \frac{35}{36 \times 8} = \frac{35}{288} \quad \text{Ans.} & \text{So, } \frac{35}{36} \div 12 = \frac{35}{432} \quad \text{Ans.} \\ (2) \quad \frac{125}{144} \times 7 &= \frac{875}{144} = 6\frac{11}{144} \quad \text{Ans.} & \frac{125}{144} \times 8 = \frac{125}{18} = 6\frac{17}{18} \quad \text{Ans.} \\ \frac{125}{144} \times 9 &= \frac{125}{16} = 7\frac{13}{16} \quad \text{Ans.} & \frac{125}{144} \times 16 = \frac{125}{9} = 13\frac{8}{9} \quad \text{Ans.} \\ \frac{125}{144} \div 5 &= \frac{25}{144} \quad \text{Ans.} & \frac{125}{144} \div 8 = \frac{125}{1152} \quad \text{Ans.} \\ \frac{125}{144} \div 12 &= \frac{125}{1728} \quad \text{Ans.} & \frac{125}{144} \div 25 = \frac{5}{144} \quad \text{Ans.} \end{aligned}$$

- (3)  $\frac{320}{693} \times 2, 3, 4, 5, 7, = \frac{640}{693}, \frac{320}{231}, \frac{1280}{693}, \frac{1600}{693}, \frac{320}{99}$ . *Ans.*  
 (4)  $\frac{320}{693} \div 7, 8, 9, 10, 11, = \frac{320}{4851}, \frac{40}{693}, \frac{320}{6237}, \frac{32}{693}, \frac{320}{7623}$ . *Ans.*
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**Ex. 24.** (p. 41.)

- (1)  $\frac{324}{720} = \frac{54}{120} = \frac{9}{20}$ . *Ans.* (2)  $\frac{720}{864} = \frac{60}{72} = \frac{5}{6}$ . *Ans.*  
 (3)  $\frac{324}{396} = \frac{27}{33} = \frac{9}{11}$ . *Ans.* (4)  $\frac{1584}{5940} = \frac{264}{990} = \frac{24}{90} = \frac{4}{15}$ . *Ans.*  
 (5)  $\frac{1296}{1620} = \frac{108}{135} = \frac{12}{15} = \frac{4}{5}$ . *Ans.* (6)  $\frac{1452}{2178} = \frac{132}{198} = \frac{22}{33} = \frac{2}{3}$ . *Ans.*  
 (7)  $\frac{495}{1210} = \frac{45}{110} = \frac{9}{22}$ . *Ans.* (8)  $\frac{1296}{1728} = \frac{108}{144} = \frac{9}{12} = \frac{3}{4}$ . *Ans.*  
 (9)  $\frac{1872}{2016} = \frac{156}{168} = \frac{13}{14}$ . *Ans.* (10)  $\frac{990}{1935} = \frac{198}{387} = \frac{22}{43}$ . *Ans.*  
 (11)  $\frac{3000}{3375} \left[ \times \frac{8}{8} \right] = \frac{24,000}{270,000} = \frac{4}{45}$ . *Ans.* (12)  $\frac{2592}{3456} = \frac{216}{288} = \frac{3}{4}$ . *Ans.*  
 (13)  $\frac{1485}{2160} = \frac{165}{240} = \frac{11}{16}$ . *Ans.* (14)  $\frac{864}{3072} = \frac{72}{256} = \frac{9}{32}$ . *Ans.*  
 (15)  $\frac{3300}{4235} = \frac{300}{385} = \frac{60}{77}$ . *Ans.* (16)  $\frac{6930}{8118} = \frac{630}{738} = \frac{70}{82} = \frac{35}{41}$ . *Ans.*  
 (17)  $\frac{5544}{6552} = \frac{462}{546} = \frac{77}{91} = \frac{11}{13}$ . *Ans.* (18)  $\frac{7040}{7392} = \frac{880}{924} = \frac{80}{84} = \frac{20}{21}$ . *Ans.*  
 (19)  $\frac{11385}{16335} = \frac{2277}{3267} = \frac{207}{297} = \frac{23}{33}$ . *Ans.*  
 (20)  $\frac{22176}{23328} = \frac{1848}{1944} = \frac{154}{162} = \frac{77}{81}$ . *Ans.*
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**Ex. 25.** (p. 42.)

- (1)  $\frac{321}{749} = \frac{107 \times 3}{107 \times 7} = \frac{3}{7}$ . *Ans.* (2)  $\frac{510}{1122} = \frac{51 \times 10}{102 \times 11} = \frac{51 \times 10}{51 \times 22} = \frac{5}{11}$ . *Ans.*  
 (3)  $\frac{299}{529} = \frac{13 \times 23}{23 \times 23} = \frac{13}{23}$ . *Ans.* (4)  $\frac{1407}{4422} = \frac{201 \times 7}{402 \times 11} = \frac{201 \times 7}{201 \times 22} = \frac{7}{22}$ . *Ans.*

- (5)  $\frac{1905}{3175} = \frac{381 \times 5}{635 \times 5} = \frac{127 \times 3}{127 \times 5} = \frac{3}{5}$  *Ans.* (6)  $\frac{1715}{2695} = \frac{343 \times 5}{539 \times 5}$   
 $= \frac{49 \times 7}{77 \times 7} = \frac{7}{11}$  *Ans.* (7)  $\frac{6509}{7889} = \frac{6509}{1127 \times 7} = \frac{6509}{161 \times 49}$   
 $= \frac{6509}{23 \times 343} = \frac{23 \times 283}{23 \times 343} = \frac{283}{343}$  *Ans.* (8)  $\frac{1589}{2270} = \frac{227 \times 7}{227 \times 10} = \frac{7}{10}$  *Ans.*  
 9)  $\frac{8251}{14718} = \frac{8251}{1388 \times 11} = \frac{8251}{223 \times 66} = \frac{223 \times 37}{223 \times 66} = \frac{37}{66}$  *Ans.*  
 10)  $\frac{3575}{4719} = \frac{715 \times 5}{1573 \times 3} = \frac{143 \times 25}{143 \times 33} = \frac{25}{33}$  *Ans.* (11)  $\frac{1261}{44232} = \frac{1261}{5529 \times 8}$   
 $= \frac{97 \times 13}{97 \times 19 \times 24} = \frac{13}{456}$  *Ans.* (12)  $\frac{10759}{20405} = \frac{1537}{2915} = \frac{1537}{583 \times 5} = \frac{1537}{53 \times 55}$   
 $= \frac{53 \times 29}{53 \times 55} = \frac{29}{55}$  *Ans.*

## Ex. 26. (p.43.)

- |  |   |   |
|--|---|---|
| (1)<br>$\begin{array}{r} £3 \ 17 \ 4\frac{3}{8} \\ - £19 \ 6 \ 9\frac{7}{8} \\ \hline \end{array}$   | (2)<br>$\begin{array}{r} £5 \ 11 \ 2\frac{1}{2} \\ - £38 \ 18 \ 7\frac{3}{4} \\ \hline \end{array}$   | (3)<br>$\begin{array}{r} £4 \ 0 \ 5\frac{1}{2} \\ - £36 \ 4 \ 3 \\ \hline \end{array}$                |
| (4)<br>$\begin{array}{r} £7 \ 8 \ 11\frac{5}{6} \\ - £81 \ 18 \ 10\frac{1}{2} \\ \hline \end{array}$ | (5)<br>$\begin{array}{r} £6 \ 1 \ 7\frac{9}{10} \\ - 30 \ 8 \ 3\frac{1}{3} \\ \hline \end{array}$     | (6)<br>$\begin{array}{r} £8 \ 2 \ 5\frac{1}{2} \\ - 73 \ 2 \ 4\frac{1}{5} \\ \hline \end{array}$      |
| (7)<br>$\begin{array}{r} £6 \ 17 \ 4\frac{5}{7} \\ - 54 \ 19 \ 1\frac{5}{7} \\ \hline \end{array}$   | (8)<br>$\begin{array}{r} £2 \ 19 \ 9\frac{7}{8} \\ - 11 \ 19 \ 3\frac{1}{2} \\ \hline \end{array}$    | (9)<br>$\begin{array}{r} £4 \ 13 \ 0\frac{5}{9} \\ - 18 \ 12 \ 2\frac{2}{9} \\ \hline \end{array}$    |
| (10)<br>$\begin{array}{r} £5 \ 3 \ 4\frac{11}{13} \\ - 31 \ 0 \ 5\frac{7}{13} \\ \hline \end{array}$ | (11)<br>$\begin{array}{r} £7 \ 14 \ 9\frac{3}{35} \\ - 46 \ 8 \ 6\frac{14}{35} \\ \hline \end{array}$ | (12)<br>$\begin{array}{r} £6 \ 18 \ 0\frac{5}{37} \\ - 55 \ 4 \ 1\frac{11}{37} \\ \hline \end{array}$ |
| $\begin{array}{r} £219 \ 16 \ 6\frac{2}{7} \\ - £160 \ 5 \ 8\frac{9}{13} \\ \hline \end{array}$      | $\begin{array}{r} £91 \ 4 \ 10\frac{1}{2} \\ - £286 \ 5 \ 11\frac{1}{35} \\ \hline \end{array}$       | $\begin{array}{r} £219 \ 7 \ 0\frac{3}{5} \\ - £134 \ 18 \ 4\frac{1}{5} \\ \hline \end{array}$        |



KEY TO COLENSO'S ARITHMETIC.

$$\begin{array}{r} (13) \\ 3) \underline{\underline{\pounds 2 \ 0 \ 1}} \\ \underline{\pounds 0 \ 13 \ 4\frac{1}{3}} \end{array}$$

$$\begin{array}{r} (14) \\ 4) \underline{\underline{\pounds 9 \ 7 \ 3\frac{1}{2}}} \\ \underline{\pounds 2 \ 6 \ 9\frac{1}{2}} \end{array}$$

$$\begin{array}{r} (15) \\ 5) \underline{\underline{\pounds 29 \ 17 \ 8}} \\ \underline{\pounds 5 \ 19 \ 6\frac{2}{5}} \end{array}$$

$$\begin{array}{r} (16) \\ 6) \underline{\underline{\pounds 72 \ 13 \ 5}} \\ \underline{\pounds 12 \ 2 \ 2\frac{5}{6}} \end{array}$$

$$\begin{array}{r} (17) \\ 9) \underline{\underline{\pounds 8 \ 13 \ 0}} \\ \underline{\pounds 0 \ 19 \ 2\frac{2}{3}} \end{array}$$

$$\begin{array}{r} (18) \\ 10) \underline{\underline{\pounds 37 \ 6 \ 2}} \\ \underline{\pounds 3 \ 14 \ 7\frac{2}{5}} \end{array}$$

$$\begin{array}{r} (19) \\ 8) \underline{\underline{\pounds 73 \ 4 \ 5\frac{1}{2}}} \\ \underline{\pounds 9 \ 2 \ 6\frac{1}{8}} \end{array}$$

$$\begin{array}{r} (20) \\ 7) \underline{\underline{\pounds 29 \ 7 \ 0\frac{1}{3}}} \\ \underline{\pounds 4 \ 3 \ 10\frac{5}{14}} \end{array}$$

$$\begin{array}{r} (21) \\ 9) \underline{\underline{\pounds 131 \ 11 \ 5\frac{3}{4}}} \\ \underline{\pounds 7 \ 15 \ 3\frac{11}{36}} \end{array}$$

$$\begin{array}{r} (22) \\ 12) \underline{\underline{\pounds 53 \ 4 \ 0\frac{1}{2}}} \\ \underline{\pounds 4 \ 8 \ 8\frac{1}{4}} \end{array}$$

$$\begin{array}{r} (23) \\ 3) \underline{\underline{\pounds 194 \ 15 \ 6}} \\ \underline{5) 41 \ 11 \ 10} \\ \underline{\pounds 8 \ 6 \ 4\frac{2}{5}} \end{array}$$

$$\begin{array}{r} (24) \\ 3) \underline{\underline{\pounds 131 \ 11 \ 8\frac{1}{2}}} \\ \underline{6) 43 \ 17 \ 2\frac{3}{4}} \\ \underline{\pounds 7 \ 6 \ 2\frac{1}{24}} \end{array}$$

$$\begin{array}{r} (25) \\ 4) \underline{\underline{\pounds 135 \ 14 \ 10}} \\ \underline{10) 33 \ 18 \ 8\frac{1}{2}} \\ \underline{\pounds 3 \ 7 \ 10\frac{9}{20}} \end{array}$$

$$\begin{array}{r} (26) \\ 6) \underline{\underline{\pounds 111 \ 11 \ 11\frac{1}{2}}} \\ \underline{10) 18 \ 11 \ 11\frac{7}{8}} \\ \underline{\pounds 1 \ 17 \ 2\frac{31}{80}} \end{array}$$

$$\begin{array}{r} (27) \\ 2) \underline{\underline{\pounds 1275 \ 3 \ 8}} \\ \underline{100) 6,37 \ 11 \ 10} \\ \underline{20} \\ \underline{7,51} \\ \underline{12} \\ \underline{6,22 = 6\frac{22}{100}d.} \end{array}$$

$$\begin{array}{r} (28) \\ 5) \underline{\underline{\pounds 675 \ 13 \ 6\frac{1}{5}}} \\ \underline{100) 1,35 \ 2 \ 8\frac{1}{2}} \\ \underline{20} \\ \underline{7,02} \\ \underline{12} \\ \underline{32\frac{1}{2} = 65d.} \\ \underline{100 \ 200} \end{array}$$

$$\text{Ans. } \underline{\underline{\pounds 6 \ 7 \ 6\frac{11}{60}}}$$

$$\text{Ans. } \underline{\underline{\pounds 1 \ 7 \ 0\frac{13}{40}}}$$

$$\begin{array}{r} (29) \\ 1000) \underline{\underline{\pounds 1,134 \ 15 \ 10}} \\ \underline{20} \\ \underline{2,695} \\ \underline{12} \\ \underline{8,350 = 8\frac{350}{1000}d.} \end{array}$$

$$\text{Ans. } \underline{\underline{\pounds 1 \ 2 \ 8\frac{7}{10}}}$$

$$\begin{array}{r} (30) \\ 3) \underline{\underline{\pounds 4332 \ 13 \ 7\frac{2}{3}}} \\ \underline{1000) 1,444 \ 4 \ 6\frac{7}{15}} \\ \underline{20} \\ \underline{8,884} \\ \underline{12} \\ \underline{10,614\frac{7}{15} = 10\frac{7375}{15000}d.} \\ \underline{\pounds 1 \ 8 \ 10\frac{59}{60}} \end{array}$$

$$\text{Ans. } \underline{\underline{\pounds 1 \ 8 \ 10\frac{59}{60}}}$$

**Ex. 27.** (p. 44.)

- $$(1) \frac{4}{1} \times \frac{5}{3} \times \frac{1}{2} = \frac{5}{3} = 1\frac{2}{3} \quad (2) \frac{2}{1} \times \frac{5}{7} \times \frac{2}{3} = \frac{20}{7} = 2\frac{6}{7}$$
- $$(3) \frac{3}{1} \times \frac{4}{5} \times \frac{3}{4} = \frac{9}{5} = 1\frac{4}{5} \quad (4) \frac{7}{2} \times \frac{1}{4} \times \frac{2}{3} = \frac{7}{12} \quad (5) \frac{8}{8} \times \frac{8}{8} \times \frac{2}{8} = \frac{1}{4}$$
- $$(6) \frac{88}{8} \times \frac{34}{11} \times \frac{2}{8} = \frac{34}{3} = 11\frac{1}{3} \quad (7) \frac{3}{10} \times \frac{8}{8} \times \frac{2}{8} = \frac{3}{40}$$
- $$(8) \frac{7}{2} \times \frac{5}{8} \times \frac{2}{7} = \frac{5}{8} \quad (9) \frac{10}{1} \times \frac{15}{2} \times \frac{21}{8} = \frac{315}{2} = 157\frac{1}{2}$$
- $$(10) \frac{11}{2} \times \frac{8}{8} \times \frac{5}{2} = 11 \quad (11) \frac{2}{8} \times \frac{5}{8} \times \frac{8}{4} = \frac{10}{3} = 3\frac{1}{3}$$
- $$(12) \frac{3}{2} \times \frac{2}{8} \times \frac{22}{7} = \frac{66}{4} = 16\frac{1}{2} \quad (13) \frac{7}{8} \times \frac{9}{1} \times \frac{11}{2} \times \frac{8}{7} = \frac{693}{16} = 43\frac{5}{16}$$
- $$(14) \frac{3}{8} \times \frac{2}{8} \times \frac{8}{8} \times \frac{12}{8} = 3 \quad (15) \frac{7}{1} \times \frac{8}{8} \times \frac{8}{7} \times \frac{1}{8} = \frac{1}{2}$$
- $$(16) \frac{7}{2} \times \frac{13}{4} \times \frac{13}{2} \times \frac{3}{8} = \frac{39}{64} \quad (17) \frac{1}{4} \times \frac{18}{8} \times \frac{11}{9} \times \frac{8}{11} = \frac{4}{9}$$
- $$(18) \frac{24}{8} \times \frac{1}{4} \times \frac{8}{8} \times \frac{8}{2} = 72 \quad (19) \frac{7}{15} \times \frac{8}{8} \times \frac{8}{4} \times \frac{22}{8} = 1\frac{2}{5}$$
- $$(20) \frac{21}{2} \times \frac{3}{7} \times \frac{5}{2} \times \frac{7}{11} = \frac{315}{44} = 7\frac{7}{44}$$

**Ex. 28.** (p. 45.)

- (1) L. C. M. of 2, 3, 5, 7,  $= 2 \times 3 \times 5 \times 7 = 210$ ; which, divided by 2, 3, 5, 7, gives 105, 70, 42, 30, as multipliers for the numerators.

$$\text{Hence } \frac{1}{2} \times \frac{2}{3} \times \frac{3}{5} \times \frac{2}{7} = \frac{105}{210} \times \frac{140}{210} \times \frac{126}{210} \times \frac{60}{210} \quad \text{Ans.}$$

- (2)  $\frac{5}{6}, \frac{4}{7}, \frac{4}{5}, \frac{2}{11}$  L. C. M. 2310. Multipliers, 385, 330, 462, 210;  
 $\therefore \frac{1925}{2310}, \frac{1320}{2310}, \frac{1848}{2310}, \frac{420}{2310}$  *Ans.*
- (3)  $\frac{2}{3}, \frac{3}{4}, \frac{5}{6}, \frac{7}{8}$  L. C. M. 24. Multipliers, 8, 6, 4, 3;  
 $\therefore \frac{16}{24}, \frac{18}{24}, \frac{20}{24}, \frac{21}{24}$  *Ans.*
- (4)  $\frac{1}{8}, \frac{5}{9}, \frac{3}{16}, \frac{13}{18}$  L. C. M. 144. Multipliers, 18, 16, 9, 8;  
 $\therefore \frac{18}{144}, \frac{80}{144}, \frac{27}{144}, \frac{104}{144}$  *Ans.*
- (5)  $\frac{3}{4}, \frac{7}{8}, \frac{15}{16}, \frac{31}{32}$  L. C. M. 32. Multipliers, 8, 4, 2, 1.  
 $\therefore \frac{24}{32}, \frac{28}{32}, \frac{30}{32}, \frac{31}{32}$  *Ans.*
- (6)  $\frac{5}{6}, \frac{5}{8}, \frac{2}{9}, \frac{13}{24}$  L. C. M. 72. Multipliers, 12, 9, 8, 3.  
 $\therefore \frac{60}{72}, \frac{45}{72}, \frac{16}{72}, \frac{39}{72}$  *Ans.*
- (7)  $\frac{7}{16}, \frac{11}{18}, \frac{17}{24}, \frac{19}{36}, \frac{25}{48}$  L. C. M. 144. Multipliers, 9, 8, 6, 4, 3.  
 $\therefore \frac{63}{144}, \frac{88}{144}, \frac{102}{144}, \frac{76}{144}, \frac{75}{144}$  *Ans.*
- (8)  $\frac{2}{3}, \frac{4}{9}, \frac{16}{27}, \frac{8}{81}, \frac{16}{243}$  L. C. M. 243. Multipliers, 81, 27, 9, 3, 1.  
 $\therefore \frac{162}{243}, \frac{108}{243}, \frac{144}{243}, \frac{24}{243}, \frac{16}{243}$  *Ans.*
- (9)  $\frac{4}{7}, \frac{3}{10}, \frac{5}{12}, \frac{17}{35}, \frac{4}{63}, \frac{15}{28}$  L. C. M. 1260. Multipliers, 180, 126,  
 105, 36, 20, 45.  $\therefore \frac{720}{1260}, \frac{378}{1260}, \frac{525}{1260}, \frac{612}{1260}, \frac{80}{1260}, \frac{675}{1260}$  *Ans.*
- (10)  $\frac{11}{27}, \frac{17}{24}, \frac{5}{6}, \frac{7}{15}, \frac{2}{9}, \frac{35}{36}$  L. C. M. 1080. Multipliers, 40, 45, 180,  
 72, 120, 30.  $\therefore \frac{440}{1080}, \frac{765}{1080}, \frac{900}{1080}, \frac{504}{1080}, \frac{240}{1080}, \frac{1050}{1080}$  *Ans.*
- (11)  $\frac{3}{5}, \frac{7}{10}, \frac{6}{25}, \frac{11}{30}, \frac{13}{45}, \frac{23}{60}$  L. C. M. 900. Multipliers, 180, 90,  
 36, 30, 20, 15.  $\therefore \frac{540}{900}, \frac{630}{900}, \frac{216}{900}, \frac{330}{900}, \frac{260}{900}, \frac{345}{900}$  *Ans.*

$$(12) \quad \frac{5}{7} \frac{11}{12}, \frac{2}{15}, \frac{8}{27}, \frac{9}{35}, \frac{17}{40} \quad \text{L. C. M. 7560. Multipliers, 1080, 630,}$$

$$504, 280, 216, 189. \therefore \frac{5400}{7560}, \frac{6930}{7560}, \frac{1008}{7560}, \frac{2240}{7560}, \frac{1944}{7560}, \frac{3213}{7560}.$$

*Ans.*

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**Ex. 29.** (p. 46.)

- (1)  $\frac{4}{7} + \frac{2}{7} + \frac{6}{7} + \frac{5}{7} + \frac{3}{7} = \frac{20}{7} = 2 \frac{6}{7}$  *Ans.*
- (2) L. C. M. of 2, 3, 8, 12, = 24. Multipliers, 12, 8, 3, 2.  
 $\frac{1}{2} + \frac{1}{3} + \frac{7}{8} + \frac{5}{12} = \frac{12+8+21+10}{24} = \frac{51}{24} = \frac{17}{8} = 2 \frac{1}{8}$  *Ans.*
- (3) L. C. M. of 2, 4, 6, 9, = 36. Multipliers, 18, 9, 6, 4.  
 $\frac{1}{2} + \frac{3}{4} + \frac{5}{6} + \frac{7}{9} = \frac{18+27+30+28}{36} = \frac{103}{36} = 2 \frac{31}{36}$  *Ans.*
- (4) L. C. M. of 18, 15, 20, 30, = 180. Multipliers, 10, 12, 9, 6.  
 $\frac{13}{18} + \frac{8}{15} + \frac{11}{20} + \frac{13}{30} = \frac{130+96+99+78}{180} = \frac{403}{180} = 2 \frac{43}{180}$  *Ans.*
- (5) L. C. M. of 3, 6, 9, 12, = 36. Multipliers, 12, 6, 4, 3.  
 $\frac{2}{3} + \frac{1}{6} + \frac{5}{9} + \frac{11}{12} = \frac{24+6+20+33}{36} = \frac{83}{36} = 2 \frac{11}{36}$  *Ans.*
- (6) L. C. M. of 8, 12, 16, 18, = 144. Multipliers, 18, 12, 9, 8.  
 $\frac{7}{8} + \frac{7}{12} + \frac{7}{16} + \frac{7}{18} = \frac{(18+12+9+8) \times 7}{144} = \frac{47 \times 7}{144} = 2 \frac{41}{144}$  *Ans.*
- (7) L. C. M. of 10, 15, 5, 9, = 90. Multipliers, 9, 6, 18, 10.  
 $\frac{3}{10} + \frac{13}{15} + \frac{1}{5} + \frac{4}{9} = \frac{27+78+18+40}{90} = \frac{163}{90} = 1 \frac{73}{90}$  *Ans.*
- (8) L. C. M. of 70, 21, 5, 42, = 210. Multipliers, 3, 10, 42, 5.  
 $\frac{11}{70} + \frac{5}{21} + \frac{1}{5} + \frac{17}{42} = \frac{33+50+42+85}{210} = \frac{210}{210} = 1$  *Ans.*
- (9) L. C. M. of 2, 3, 4, = 12. Multipliers, 6, 4, 3.  
 $\frac{1}{2} + \frac{1}{3} + \frac{1}{4} = \frac{6+4+3}{12} = \frac{13}{12};$   
 $2+3+4+5 + 1 \frac{1}{12} = 15 \frac{1}{12}$  *Ans.*
- (10) L. C. M. of 8, 6, 12, 9, = 72. Multipliers, 9, 12, 6, 8.  
 $\frac{3}{8} + \frac{5}{6} + \frac{7}{12} + \frac{4}{9} = \frac{27+60+42+32}{72} = \frac{161}{72};$   
 $3+2+3+2 \frac{17}{72} = 10 \frac{17}{72}$  *Ans.*

- (11) L. C. M. of 3, 5, 6, = 30. Multipliers, 10, 6, 5.

$$\frac{2}{3} + \frac{3}{5} + \frac{5}{6} = \frac{20 + 18 + 25}{30} = \frac{63}{30} = \frac{21}{10};$$

$$2 + 4 + 5 + 2 \frac{1}{10} = 13 \frac{1}{10}. \text{ Ans.}$$

- (12) L. C. M. of 8, 6, 18, 12, = 72. Multipliers, 9, 12, 4, 6.

$$\frac{3}{8} + \frac{1}{6} + \frac{5}{18} + \frac{1}{12} = \frac{27 + 12 + 20 + 6}{72} = \frac{65}{72};$$

$$1 + 2 + \frac{65}{72} = 3 \frac{65}{72}. \text{ Ans.}$$

- (13) L. C. M. of 27, 54, 45, 10, = 270. Multipliers, 10, 5, 6, 27.

$$\frac{2}{27} + \frac{5}{54} + \frac{7}{45} + \frac{1}{10} = \frac{20 + 25 + 42 + 27}{270} = \frac{114}{270} = \frac{19}{45};$$

$$11 + 2 + \frac{19}{45} = 13 \frac{19}{45}. \text{ Ans.}$$

- (14) L. C. M. of 12, 15, 27, 40, = 1080. Multipliers, 90, 72, 40, 27.

$$\frac{11}{12} + \frac{14}{15} + \frac{26}{27} + \frac{39}{40} = \frac{990 + 1008 + 1040 + 1053}{1080} = \frac{4091}{1080} = 3 \frac{851}{1080}.$$

Ans.

- (15) L. C. M. of 42, 21, 63, 14, = 126. Multipliers, 3, 6, 2, 9.

$$\frac{1}{42} + \frac{5}{21} + \frac{31}{63} + \frac{11}{14} = \frac{3 + 30 + 62 + 99}{126} = \frac{194}{126} = \frac{97}{63};$$

$$3 + 1 + 1 \frac{34}{63} = 5 \frac{34}{63}. \text{ Ans.}$$

- (16) L. C. M. of 35, 7, 21, 15, = 105. Multipliers, 3, 15, 5, 7.

$$\frac{1}{35} + \frac{3}{7} + \frac{4}{21} + \frac{7}{15} = \frac{3 + 45 + 20 + 49}{105} = \frac{117}{105} = \frac{39}{35};$$

$$17 + 1 + 1 \frac{4}{35} = 19 \frac{4}{35}. \text{ Ans.}$$

- (17)
- $\frac{2}{7}$
- of
- $\frac{18}{1} + \frac{3}{5}$
- of
- $\frac{25}{21} = \frac{36}{7} + \frac{5}{7} = \frac{41}{7} = 5 \frac{6}{7}. \text{ Ans.}$

- (18) L. C. M. of 12, 15, 16, 18, 20, = 720. Multipliers, 60, 48, 45, 40, 36.

$$\frac{11}{12} + \frac{2}{15} + \frac{7}{16} + \frac{11}{18} + \frac{1}{20} = \frac{660 + 96 + 315 + 440 + 36}{720} = \frac{1547}{720};$$

$$\therefore 1 + 2 + 2 \frac{107}{720} = 5 \frac{107}{720}. \text{ Ans.}$$

- (19) L. C. M. of 16, 24, 25, 30, = 1200. Multipliers, 75, 50, 48, 40.

$$\frac{15}{16} + \frac{23}{24} + \frac{24}{25} + \frac{29}{30} = \frac{1125 + 1150 + 1152 + 1160}{1200} = \frac{4587}{1200} = \frac{1529}{400}.$$

$$\therefore 1 + 2 + 3 + 4 + 3 \frac{329}{400} = 13 \frac{329}{400}. \text{ Ans.}$$

(20)  $\frac{3}{5}$  of  $\frac{15}{2} = \frac{9}{2} = 4\frac{1}{2}$ . L. C. M. of 4, 2, 10, = 20. Multipliers, 5, 10, 2.

$$\frac{3}{4} + \frac{1}{2} + \frac{3}{10} = \frac{15+10+6}{20} = \frac{31}{20}; \therefore 5+4+8+1\frac{11}{20} = 18\frac{11}{20} \text{ Ans.}$$

(21)  $\frac{4}{5}$  of  $\frac{3}{7}$  of  $\frac{21}{2} = \frac{18}{5} = 3\frac{3}{5}$ . L. C. M. of 3, 11, 5, = 165.

$$\text{Multipliers, 55, 15, 33; hence, } \frac{2}{3} + \frac{2}{11} + \frac{3}{5} = \frac{110+30+99}{165} = \frac{239}{165};$$

$$\therefore 7+3+1\frac{74}{165} = 11\frac{74}{165} \text{ Ans.}$$

(22)  $\frac{11}{4}$  of  $\frac{11}{3} = \frac{121}{12} = 10\frac{1}{12}$ ;  $\frac{111}{16} = 6\frac{15}{16}$ ;  $\frac{14}{5}$  of  $\frac{33}{8}$  of  $\frac{11}{8} = 15\frac{141}{160}$ ;

$$\frac{14}{3} \text{ of } \frac{2}{15} \text{ of } \frac{17}{8} \text{ of } \frac{10}{7} = \frac{17}{9} = 1\frac{8}{9}.$$

L. C. M. of 12, 16, 160, 9, = 1440. Multipliers, 120, 90, 9, 160.

$$\frac{1}{12} + \frac{15}{16} + \frac{141}{160} + \frac{8}{9} = \frac{120+1350+1269+1280}{1440} = \frac{4019}{1440};$$

$$\therefore 10+6+15+1+2\frac{1139}{1440} = 34\frac{1139}{1440} \text{ Ans.}$$

(23)  $\frac{2}{3} + \frac{7}{12} + \frac{3}{4} + \frac{5}{6} + \frac{1}{2} + \frac{3}{8} = \frac{16+14+18+20+12+9}{24} = \frac{89}{24} d. = 3\frac{17}{24} d.,$

$$\&c. \text{ £29 } 3s. 10\frac{17}{24} d. \text{ Ans.}$$

(24)  $\frac{7}{18} + \frac{5}{12} + \frac{1}{2} + \frac{3}{4} + \frac{4}{9} + \frac{5}{6} = \frac{14+15+18+27+16+30}{36} = \frac{120}{36} d. =$

$$\frac{10}{3} d. = 3\frac{1}{3} d., \&c. \text{ £26 } 6s. 6\frac{1}{3} d. \text{ Ans.}$$

(25)  $\frac{9}{10} + \frac{2}{3} + \frac{11}{15} + \frac{5}{6} + \frac{4}{5} + \frac{1}{2} = \frac{27+20+22+25+24+15}{30} = \frac{133}{30} d. =$

$$4\frac{13}{30} d., \&c. \text{ £28 } 7s. 9\frac{13}{30} d. \text{ Ans.}$$

(26)  $\frac{1}{2} + \frac{7+3}{8} + \frac{7}{16} + \frac{5}{12} + \frac{3}{4} = \frac{24+60+21+20+36}{48} = \frac{161}{48} = 3\frac{17}{48} d., \&c.$

$$\text{£28 } 10s. 1\frac{17}{48} d. \text{ Ans.}$$

(27)  $\frac{19}{20} + \frac{4}{5} + \frac{9}{10} + \frac{3}{4} + \frac{3}{8} + \frac{1}{2} = \frac{38+32+36+30+15+20}{40} = \frac{171}{40} = 4\frac{11}{40} d.,$

$$\&c. \text{ £39 } 3s. 0\frac{11}{40} d. \text{ Ans.}$$

$$(28) \frac{1}{9} + \frac{2}{7} + \frac{11}{21} + \frac{4}{9} + \frac{3}{7} + \frac{1}{3} = \frac{8}{9} + \frac{5}{7} + \frac{11}{21} = \frac{56+45+33}{63} = \frac{134}{63} = 2\frac{8}{63}d.,$$

$$\&c. \quad £32 \ 12s. \ 9\frac{8}{63}d. \quad Ans.$$

$$(29) \frac{7}{12} + \frac{1}{8} + \frac{1}{2} + \frac{5}{6} + \frac{1}{4} + \frac{1}{3} = \frac{7+10+3+4}{12} + \frac{1+4}{8} = 2\frac{5}{8}d. \quad \&c.$$

$$£87 \ 13s. \ 8\frac{5}{8}d. \quad Ans.$$

$$(30) \frac{3}{4} + \frac{7}{8} + \frac{11}{12} + \frac{2}{3} + \frac{1}{6} + \frac{2}{9} = \frac{54+63+66+48+12+16}{72} = \frac{259}{72}d. =$$

$$3\frac{43}{72}d., \&c. \quad £70 \ 10s. \ 11\frac{43}{72}d. \quad Ans.$$

## Ex. 30. (p. 47.)

$$(1) \frac{11}{15} - \frac{8}{15} = \frac{3}{15} = \frac{1}{5}. \quad Ans. \quad \frac{13}{20} - \frac{7}{20} = \frac{6}{20} = \frac{3}{10}. \quad Ans.$$

$$\frac{8}{15} - \frac{9}{20} = \frac{32-27}{60} = \frac{5}{60} = \frac{1}{12}. \quad Ans. \quad \frac{1}{2} - \frac{1}{3} = \frac{3-2}{6} = \frac{1}{6}. \quad Ans.$$

$$(2) \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}. \quad Ans. \quad \frac{3}{4} - \frac{2}{8} = \frac{3}{8} - \frac{2}{8} = \frac{1}{8}. \quad Ans.$$

$$5 - 2\frac{6}{7} = 2\frac{1}{7}. \quad Ans. \quad 10\frac{3}{5} - \frac{11}{60} = 10\frac{36}{60} - \frac{11}{60} = 10\frac{5}{12}. \quad Ans.$$

$$(3) 1\frac{4}{25} - \frac{3}{4} = 1\frac{16}{100} - \frac{75}{100} = \frac{116-75}{100} = \frac{41}{100}. \quad Ans.$$

$$9 - 3\frac{4}{25} = 5\frac{21}{25}. \quad Ans. \quad 97\frac{1}{2} - 48\frac{5}{6} = 49\frac{3}{6} - \frac{5}{6} = 49 - \frac{1}{3} = 48\frac{2}{3}. \quad Ans.$$

$$5\frac{3}{14} - 2\frac{10}{21} = 3\frac{9}{42} - \frac{20}{42} = 3 - \frac{11}{42} = 2\frac{31}{42}. \quad Ans.$$

$$(4) 13\frac{2}{75} - 3\frac{8}{15} = 10 + \frac{2}{75} - \frac{40}{75} = 10 - \frac{38}{75} = 9\frac{37}{75}. \quad Ans.$$

$$4\frac{1}{24} - 3\frac{1}{16} = 1 + \frac{2}{48} - \frac{3}{48} = 1 - \frac{1}{48} = \frac{47}{48}. \quad Ans.$$

$$3\frac{2}{9} - \frac{61}{126} = 3 - \frac{61}{126} + \frac{28}{126} = 3 - \frac{11}{42} = 2\frac{31}{42}. \quad Ans.$$

$$24\frac{1}{24} - 21\frac{1}{21} = 3 - \frac{8}{168} + \frac{7}{168} = 3 - \frac{1}{168} = 2\frac{167}{168}. \quad Ans.$$

$$(5) \quad 1\frac{8}{25} - \frac{4}{7} = \frac{231-100}{175} = \frac{131}{175}. \quad \text{Ans.}$$

$$17\frac{1}{35} - \frac{4}{21} = 17 - \frac{20}{105} + \frac{3}{105} = 17 - \frac{17}{105} = 16\frac{88}{105}. \quad \text{Ans.}$$

$$4\frac{3}{5} - \frac{1}{6} = 4 - \frac{5}{30} + \frac{18}{30} = 4\frac{13}{30}. \quad \text{Ans.}$$

$$\frac{9}{10} - \frac{6}{55} = \frac{99-12}{110} = \frac{87}{110}. \quad \text{Ans.}$$

$$(6) \quad \frac{5}{3} \text{ of } \frac{25}{9} = \frac{125}{27} = 4\frac{17}{27};$$

$$4\frac{17}{27} - 3\frac{17}{18} = 1 + \frac{34}{55} - \frac{51}{54} = 1 - \frac{17}{54} = \frac{37}{54}. \quad \text{Ans.}$$

$$\frac{16}{3} \text{ of } \frac{9}{2} = 24; \text{ and } \frac{13}{4} \text{ of } \frac{16}{5} = 10\frac{2}{5};$$

$$24 - 10\frac{2}{5} = 14 - \frac{2}{5} = 13\frac{3}{5}. \quad \text{Ans.}$$

$$(7) \quad \frac{1}{4} + \frac{2}{5} + \frac{5}{8} - \frac{1}{2} - \frac{11}{24} - \frac{5}{6} = \frac{30+48+75-60-55-100}{120} = -\frac{31}{60}$$

$$3+4+16+10-5-7-14=7; \therefore 7 - \frac{31}{60} = 6\frac{29}{60}. \quad \text{Ans.}$$

$$(8) \quad \frac{1}{5} + \frac{13}{2} + \frac{1}{12} + \frac{1}{9} - \frac{5}{6} - \frac{3}{10} - \frac{1}{4} = \frac{36+1170+15+20-150-54-45}{180}$$

$$= \frac{992}{180} = \frac{248}{45} = 5\frac{23}{45}; \text{ hence, } 5+3+8+5-2-3-16 + \frac{23}{45} = \frac{23}{45}. \quad \text{Ans.}$$

$$(9) \quad 12 + 5\frac{1}{2} - 6\frac{1}{3} = 11 + \frac{3}{6} - \frac{2}{6} = 11\frac{1}{6}d., \text{ \&c. } \quad \text{£8 2s. } 11\frac{1}{6}d. \quad \text{Ans.}$$

$$(10) \quad 11\frac{3}{4} - 4\frac{1}{6} = 7 + \frac{9}{12} - \frac{2}{12} = 7\frac{7}{12}d., \text{ \&c. } \quad 18s. \quad 7\frac{7}{12}d. \quad \text{Ans.}$$

$$(11) \quad 12\frac{1}{2} - 7\frac{2}{9} = 5 + \frac{9}{18} - \frac{4}{18} = 5\frac{5}{18}d., \text{ \&c. } \quad 2s. \quad 5\frac{5}{18}d. \quad \text{Ans.}$$

$$(12) \quad 12 + 3\frac{5}{8} - 9\frac{11}{12} = 6 + \frac{15}{24} - \frac{22}{24} = 6 - \frac{7}{24} = 5\frac{17}{24}d., \text{ \&c.}$$

$$\text{£5 0s. } 5\frac{17}{24}d. \quad \text{Ans.}$$

$$(13) \quad 12 + 7\frac{5}{12} - 9\frac{13}{16} = 10 + \frac{20}{48} - \frac{39}{48} = 10 - \frac{19}{48} = 9\frac{29}{48}d., \text{ \&c.}$$

$$17s. \quad 9\frac{29}{48}d. \quad \text{Ans.}$$



$$(14) 12 + 6\frac{3}{5} - 9\frac{2}{3} = 9 + \frac{9}{15} - \frac{10}{15} = 9 - \frac{1}{15} = 8\frac{14}{15}d., \text{ \&c.}$$

$$£3 \text{ } 13s. \text{ } 8\frac{14}{15}d. \text{ } Ans.$$


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**Ex. 31.** (p. 48.)

$$(1) \frac{5}{12} \times \frac{9}{16} \times \frac{24}{11} = \frac{5 \times 9}{8 \times 11} = \frac{45}{88}. \text{ } Ans.$$

$$\frac{33}{16} \times \frac{3}{11} \times \frac{16}{9} = \frac{16}{16} = 1. \text{ } Ans.$$

$$\frac{27}{11} \times \frac{11}{5} \times \frac{5}{36} = \frac{27}{36} = \frac{3}{4}. \text{ } Ans.$$

$$(2) \frac{11}{35} \times \frac{5}{2} \times \frac{100}{1} = \frac{11 \times 50}{7} = 78\frac{4}{7}. \text{ } Ans.$$

$$\frac{40}{3} \times \frac{19}{5} \times \frac{45}{38} = 20 \times 3 = 60. \text{ } Ans.$$

$$\frac{27}{4} \times \frac{26}{9} \times \frac{21}{1} = \frac{3 \times 13 \times 21}{2} = 409\frac{1}{2}. \text{ } Ans.$$

$$(3) \frac{5}{2} \times \frac{11}{8} \times \frac{19}{4} \times \frac{8}{7} = \frac{5 \times 11 \times 19}{3 \times 7} = 49\frac{16}{21}. \text{ } Ans.$$

$$\frac{11}{5} \times \frac{11}{6} \times \frac{15}{13} \times \frac{13}{4} \times \frac{16}{11} = 11 \times 2 = 22. \text{ } Ans.$$

$$(4) \frac{1}{2} \times \frac{7}{12} \times \frac{3}{5} \times \frac{4}{11} \times \frac{22}{7} = \frac{1}{5}. \text{ } Ans.$$

$$\frac{11}{8} \times \frac{5}{6} \times \frac{5}{18} \times \frac{45}{22} \times \frac{8}{1} = \frac{5 \times 5 \times 5}{6 \times 2 \times 2} = 5\frac{5}{24}. \text{ } Ans.$$

$$(5) \frac{3}{7} \times \frac{7}{5} \times \frac{25}{2} \times \frac{11}{5} \times \frac{3}{44} = \frac{3 \times 3}{2 \times 4} = 1\frac{1}{8}. \text{ } Ans.$$

$$\frac{2}{3} \times \frac{8}{7} \times \frac{12}{5} \times \frac{35}{8} \times \frac{20}{9} = \frac{2 \times 4 \times 20}{9} = 17\frac{7}{9}. \text{ } Ans.$$


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## Ex. 32. (p. 50.)

$$(1) \quad 2 + \frac{2}{3} = \frac{2}{1} \times \frac{3}{2} = 3. \quad \text{Ans.}$$

$$\frac{2}{3} \div \frac{3}{4} = \frac{2}{3} \times \frac{4}{3} = \frac{8}{9}. \quad \text{Ans.}$$

$$\frac{8}{3} \div \frac{3}{2} = \frac{8}{3} \times \frac{2}{3} = 1\frac{7}{9}. \quad \text{Ans.}$$

$$\frac{25}{12} + \frac{10}{3} = \frac{25}{12} \times \frac{3}{10} = \frac{5}{8}. \quad \text{Ans.}$$

$$\frac{50}{3} \div \frac{25}{2} = \frac{50}{3} \times \frac{2}{25} = \frac{4}{3} = 1\frac{1}{3}. \quad \text{Ans.}$$

$$\frac{32}{75} + \frac{8}{15} = \frac{32}{75} \times \frac{15}{8} = \frac{4}{5}. \quad \text{Ans.}$$

$$(2) \quad \frac{279}{25} \div \frac{3}{5} = \frac{279}{25} \times \frac{5}{3} = \frac{93}{5} = 18\frac{3}{5}. \quad \text{Ans.}$$

$$\frac{7}{9} + \frac{14}{1} = \frac{7}{9} \times \frac{1}{14} = \frac{1}{18}. \quad \text{Ans.}$$

$$\frac{3}{5} \times \frac{8}{9} + \left(\frac{6}{7} \times \frac{3}{4}\right) = \frac{3}{5} \times \frac{8}{9} \times \frac{7}{6} \times \frac{4}{3} = \frac{112}{135}. \quad \text{Ans.}$$

$$\frac{9}{2} \times \frac{5}{27} \div \left(\frac{28}{5} \times \frac{10}{7}\right) = \frac{9}{2} \times \frac{5}{27} \times \frac{5}{28} \times \frac{7}{10} = \frac{5}{48}. \quad \text{Ans.}$$

$$(3) \quad 209 \div \frac{1}{5} \text{ of } 20 = 209 \div 4 = 52\frac{1}{4}. \quad \text{Ans.}$$

$$\frac{2}{7} \times \frac{7}{8} \div \left(\frac{3}{4} \times \frac{1}{3} \times \frac{5}{1}\right) = \frac{2}{8} \times \frac{4}{1} \times \frac{1}{5} = \frac{1}{5}. \quad \text{Ans.}$$

$$\frac{9}{2} \times \frac{10}{3} \div \left(\frac{9}{4} \times \frac{25}{4}\right) = \frac{9}{2} \times \frac{10}{3} \times \frac{4}{9} \times \frac{4}{25} = \frac{16}{15} = 1\frac{1}{15}. \quad \text{Ans.}$$

$$(4) \quad \frac{52}{3\frac{1}{4}} = \frac{52 \times 4}{3\frac{1}{4} \times 4} = \frac{52 \times 4}{13} = 4 \times 4 = 16. \quad \text{Ans.}$$

$$\frac{3\frac{3}{5}}{5} = \frac{3\frac{3}{5} \times 4}{5 \times 4} = \frac{15}{5 \times 4} = \frac{3}{4}. \quad \text{Ans.}$$

$$\frac{14}{45} \div \frac{42}{25} = \frac{14}{45} \times \frac{25}{42} = \frac{5}{27}. \quad \text{Ans.}$$

$$\frac{11}{12} \div \frac{143}{18} = \frac{11}{12} \times \frac{18}{143} = \frac{3}{26}. \quad \text{Ans.}$$

$$(5) \quad \frac{9\frac{7}{27}}{2\frac{1}{27}} = \frac{9\frac{7}{27} \times 9 \times 3}{2\frac{1}{27} \times 27} = \frac{88 \times 3}{55} = \frac{24}{5} = 4\frac{4}{5}. \quad \text{Ans.}$$

$$\frac{5\frac{3}{11}}{2\frac{7}{11}} = \frac{58}{29} = 2. \text{ Ans.}$$

$$\frac{8\frac{3}{4}}{5\frac{5}{8}} = \frac{8\frac{3}{4} \times 4 \times 2}{5\frac{5}{8} \times 8} = \frac{35 \times 2}{45} = \frac{14}{9} = 1\frac{5}{9}. \text{ Ans.}$$

$$\frac{15\frac{3}{8}}{7\frac{1}{2}} = \frac{78}{39} = 2. \text{ Ans.}$$

$$(6) \quad 23 + \left(\frac{8}{3} + \frac{2}{5}\right) = 23 \div \frac{46}{15} = \frac{23 \times 15}{46} = \frac{15}{2} = 7\frac{1}{2}. \text{ Ans.}$$

$$\frac{10}{3} \times \frac{6}{5} + \left(\frac{4}{3} \times \frac{5}{4}\right) = \frac{4}{1} \div \frac{5}{3} = \frac{4 \times 3}{5} = 2\frac{2}{5}. \text{ Ans.}$$

$$\frac{24}{7} \times \frac{35}{12} + \left(\frac{1}{33} \times \frac{121}{14}\right) = \frac{10}{1} \times \frac{3 \times 14}{11} = \frac{420}{11} = 38\frac{2}{11}. \text{ Ans.}$$

$$\left(\frac{5}{2} + \frac{5}{3}\right) + \left(\frac{11}{3} - \frac{5}{2}\right) = (15 + 10) \div (22 - 15) = 3\frac{4}{7}. \text{ Ans.}$$

$$\frac{64}{15} \times \frac{21}{8} \div \left(\frac{26}{5} - \frac{9}{2}\right) = \frac{56}{5} \div \frac{7}{10} = \frac{112}{7} = 16. \text{ Ans.}$$

**Ex. 33.** (p. 51.)

$$(1) \quad \frac{5}{8} \text{ of } 20s. = 100s. \div 8 = 12s. 6d. \text{ Ans.}$$

$$\frac{13}{20} \text{ of } 100s. = 5s. \times 13 = £3 5s. \text{ Ans.}$$

$$80d. \times \frac{2}{5} = 16d. \times 2 = 2s. 8d. \text{ Ans.}$$

$$\frac{15}{4} \text{ of } 30d. = 450d. \div 4 = 112\frac{1}{2}d. = 9s. 4\frac{1}{2}d. \text{ Ans.}$$

$$\frac{26}{9} \text{ of } 21s. = 7s. \times \frac{26}{3} = 182s. \div 3 = 60s. 8d. \text{ Ans.}$$

$$(2) \quad \begin{array}{r} £3 \quad 6 \quad 8 \times \frac{7}{10} \\ 7 \end{array}$$

$$\begin{array}{r} 10)23 \quad 6 \quad 8 \\ \underline{£2 \quad 6 \quad 8} \text{ Ans.} \end{array}$$

$$\begin{array}{r} £3 \quad 7 \quad 5 \times \frac{2}{3} \\ 2 \end{array}$$

$$\begin{array}{r} 3)6 \quad 14 \quad 10 \\ \underline{£2 \quad 4 \quad 11\frac{1}{3}} \text{ Ans.} \end{array}$$

$$\begin{array}{r} £5 \quad 4 \quad 6\frac{1}{4} \times \frac{2}{3} \\ 3 \end{array}$$

$$\begin{array}{r} 5)15 \quad 13 \quad 6\frac{1}{4} \\ \underline{£3 \quad 2 \quad 8\frac{11}{20}} \text{ Ans.} \end{array}$$

$$(3) \quad \begin{array}{r} £7 \quad 6 \quad 8\frac{1}{2} \times (2 - \frac{1}{8}); \\ 2 \end{array} \quad \begin{array}{r} £8 \quad 0 \quad 7\frac{3}{4} \times (3 - \frac{1}{4}); \\ 3 \end{array} \quad \begin{array}{r} £10 \quad 11 \quad 2\frac{1}{2} \times 3\frac{3}{4} \\ 3 \end{array}$$

$$\begin{array}{r} 14 \quad 13 \quad 5 \\ \frac{1}{8} = 1 \quad 4 \quad 5\frac{5}{8} \\ \underline{£13 \quad 8 \quad 11\frac{7}{8}} \text{ Ans.} \end{array}$$

$$\begin{array}{r} 24 \quad 1 \quad 11\frac{1}{4} \\ \frac{1}{4} = 2 \quad 0 \quad 11\frac{5}{8} \\ \underline{£22 \quad 1 \quad 9\frac{5}{8}} \text{ Ans.} \end{array}$$

$$\begin{array}{r} 4)31 \quad 13 \quad 6\frac{3}{4} \\ 7 \quad 18 \quad 4\frac{1}{8} \\ \underline{£39 \quad 11 \quad 11\frac{7}{8}} \text{ Ans.} \end{array}$$

$$(4) \quad \begin{array}{r} \text{£}13 \ 15 \ 4 \times 4\frac{1}{2}; \\ \hline 55 \ 1 \ 4 \\ \hline \frac{1}{2} = 6 \ 17 \ 8 = \frac{4}{8} \\ \frac{1}{4} = 1 \ 14 \ 5 = \frac{5}{8} \\ \hline \text{£}63 \ 13 \ 5 \text{ Ans.} \end{array} \quad \begin{array}{r} \text{£}18 \ 17 \ 0 \times (5 - \frac{1}{8}); \\ \hline 94 \ 5 \ 0 \\ \hline \frac{1}{8} = 2 \ 7 \ 1\frac{1}{2} \\ \hline \text{£}91 \ 17 \ 10\frac{1}{2} \text{ Ans.} \end{array} \quad \begin{array}{r} \text{£}2 \ 10 \ 6\frac{3}{4} \times 3\frac{3}{4} \\ \hline 4 \overline{) 7 \ 11 \ 8\frac{1}{4}} \\ \hline 1 \ 17 \ 11\frac{1}{8} \\ \hline \text{£}9 \ 9 \ 7\frac{5}{8} \text{ Ans.} \end{array}$$

$$(5) \quad \begin{array}{r} \text{£}30 \ 14 \ 6\frac{1}{2} \times (6 - \frac{1}{2}); \\ \hline 184 \ 7 \ 3 \\ \hline \frac{1}{4} = 7 \ 13 \ 7\frac{5}{8} \\ \hline \text{£}176 \ 13 \ 7\frac{3}{8} \text{ Ans.} \end{array} \quad \begin{array}{r} \text{£}7 \ 13 \ 4 \times (7 - \frac{7}{12}); \\ \hline 12 \overline{) 53 \ 13 \ 4} \\ \hline 4 \ 9 \ 5\frac{1}{3} \\ \hline \text{£}49 \ 3 \ 10\frac{2}{3} \text{ Ans.} \end{array} \quad \begin{array}{r} \text{£}4 \ 7 \ 3\frac{3}{4} \times 10\frac{7}{12} \\ \hline 43 \ 13 \ 1\frac{1}{2} \\ \hline \frac{1}{2} = 2 \ 3 \ 7\frac{7}{8} = \frac{6}{12} \\ \frac{1}{8} = 0 \ 7 \ 3\frac{3}{8} = \frac{1}{12} \\ \hline \text{£}46 \ 4 \ 0\frac{11}{12} \text{ Ans.} \end{array}$$

$$(6) \quad 20 \text{ cwt.} \times \frac{5}{7} = 100 \text{ cwt.} \div 7 = 14 \text{ cwt.} \ 1 \text{ qr.} \ 4 \text{ lbs.} \text{ Ans.}$$

$$\frac{2}{7} \text{ of } 12 \text{ oz.} = 24 \text{ oz.} \div 7 = 3 \text{ oz.} \ 8 \text{ dwt.} \ 18\frac{5}{7} \text{ grs.} \text{ Ans.}$$

$$3\frac{1}{4} \text{ cwt.} \div 1\frac{3}{11} = \frac{13}{4} \text{ cwt.} \times \frac{11}{14} = \frac{143}{56} \text{ cwt.} = 2 \text{ cwt.} \ 2 \text{ qrs.} \ 6 \text{ lbs.} \text{ Ans.}$$

$$\frac{333}{4} d. \times \frac{106}{9} = \frac{37}{2} d. \times 53 = 980\frac{1}{2} d. = \text{£}4 \text{ ls.} \ 8\frac{1}{2} d. \text{ Ans.}$$

$$(7) \quad \begin{array}{r} 2 \text{ wk.} \ 3 \text{ da.} \\ \hline 3\frac{5}{8} \\ \hline 9 \overline{) 12 \ 1} \\ \hline 1 \text{ wk.} \ 2 \text{ da.} \ 10\frac{1}{2} \text{ min.} \\ \hline 7 \ 2 \\ \hline \text{Ans.} \ 8 \text{ wk.} \ 4 \text{ da.} \ 10\frac{1}{2} \text{ min.} \end{array} \quad \begin{array}{r} 3 \text{ ac.} \ 3 \text{ ro.} \ 3 \text{ po.} \\ \hline 10\frac{5}{12} \\ \hline 12 \overline{) 18 \ 3 \ 15} \\ \hline 1 \ 2 \ 11\frac{1}{4} \\ \hline 37 \ 2 \ 30 \\ \hline 39 \text{ ac.} \ 1 \text{ ro.} \ 1\frac{1}{4} \text{ po.} \text{ Ans.} \end{array} \quad \begin{array}{r} 15 \text{ 2s.} \ 9\frac{3}{4} d. \times 1\frac{1}{12} \\ \hline 0 \ 2\frac{1}{2} \\ \hline 3s. \ 0d. \text{ Ans.} \end{array}$$

$$(8) \quad \frac{1}{8} \text{ of } 18\frac{1}{3} s. = 18s. \ 4d. \div 8 = 2s. \ 3\frac{1}{2} d. \text{ Ans.}$$

$$\begin{array}{r} 1 \text{ cwt.} \ 2 \text{ qrs.} \ 13 \text{ lbs.} \times \left(3\frac{12}{24} - \frac{1}{24}\right); \quad \text{£}7 \ 5s. \ 10d. \times \left(4 + \frac{20}{35} + \frac{7}{35} + 9\right) \\ \hline 3\frac{11}{24} \\ \hline \frac{1}{24} = 0 \ 3 \ 6\frac{1}{2} \\ \frac{1}{12} = 0 \ 0 \ 7\frac{1}{2} \\ \frac{1}{6} = 0 \ 2 \ 26\frac{1}{2} \\ \hline 4 \ 3 \ 11 \\ \hline 5 \text{ cwt.} \ 2 \text{ qrs.} \ 9\frac{23}{24} \text{ lbs.} \text{ Ans.} \end{array} \quad \begin{array}{r} 4 \\ \hline 7 \overline{) 29 \ 3 \ 4} = 4 \text{ times} \\ \hline 4 \ 3 \ 4 = \frac{4}{4} \\ \hline 1 \ 9 \ 2 = \frac{1}{2} \\ \hline 65 \ 12 \ 6 = 9 \text{ times} \\ \hline 100 \ 8 \ 4 \text{ Ans.} \end{array}$$

(9)  $\frac{22}{7} \div \frac{11}{9} = \frac{18}{7};$   $\frac{19}{11} + \frac{5}{3} = \frac{57}{55};$   
 $= \frac{7+11}{7} = 1 + \frac{11}{7};$   $\pounds 8 \ 8s. \ 5\frac{1}{2}d. \times 1\frac{2}{55}$   
 $\pounds 1 \ 11s. \ 6d.$   $5 \overline{) 16 \ 16 \ 10\frac{1}{2}}$   
 $\quad \quad \quad 1\frac{1}{2}$   $11 \overline{) 3 \ 7 \ 4\frac{1}{2}}$   
 $7 \overline{) 17 \ 6 \ 6}$   $\quad \quad \quad 0 \ 6 \ 1\frac{1}{2}}$   
 $\quad \quad \quad 2 \ 9 \ 6$   $\pounds 8 \ 14s. \ 6\frac{3}{4}$  *Ans.*  
 $\pounds 4 \ 1s. \ 0d.$  *Ans.*

$$\frac{27s.}{1} \times \frac{40}{11} \times \frac{7}{30} \times \frac{75}{7} \times \frac{2}{15} \times \frac{77}{540} = \frac{14s.}{3} = 4s. \ 8d. \quad \text{Ans.}$$

(10)  $\frac{8}{23}$  of  $\frac{11}{20} = \frac{22}{115};$   $\frac{\pounds^5}{8} = \pounds 5 + 8; \text{ and } \frac{3}{16}s. = 3s. + 16;$   
 $\frac{1}{23} = \frac{1 \text{ mi. } 5 \text{ fur. } 91 \text{ yd. } 2 \text{ ft.}}{2 \text{ fur. } 150 \text{ yd. } 1 \text{ ft.}} \times \left( \frac{23}{115} - \frac{1}{115} \right); \therefore \pounds 3 \frac{5}{8} = \pounds 3 \ 12s. \ 6d.$   
 $\frac{1}{23} = \frac{0 \quad \quad \quad 25 \quad \quad \quad 2}{2 \text{ fur. } 124 \text{ yd. } 2 \text{ ft.}} \quad \text{Ans.}$   $\text{and } 9 \frac{3}{16}s. = 0 \ 9 \ 2\frac{1}{2}$   
 $\text{Ans. } \pounds 4 \ 2s. \ 2d.$

(11)  $\frac{\pounds^3}{5} = \pounds 3 \div 5 = 12s. \ 0d.$   
 $\frac{5}{16}s. = 5s. \div 16 = 0 \ 3\frac{3}{4}$   
 $\frac{2}{9}$  of  $21s. = 42s. \div 9 = 4 \ 8$   
 $\quad \quad \quad \underline{16s. \ 11\frac{1}{2}d.} \quad \text{Ans.}$   
 $\frac{4}{7}$  cwt. =  $4 \text{ cwt.} \div 7 = 2 \text{ qrs. } 8 \text{ lbs. } 0 \text{ oz.}$   
 $8\frac{5}{6} \text{ lbs.} = 8 \text{ lbs.} + \frac{80}{6} \text{ oz.} = 0 \ 8 \ 13\frac{1}{3}$   
 $\quad \quad \quad \underline{3\frac{2}{10}}$   
 $\text{Ans. } \underline{2 \text{ qrs. } 17 \text{ lbs. } 1\frac{7}{30} \text{ oz.}}$

$4 \text{ da. } 5 \text{ ho.} \times \left( 1 + \frac{6}{36} + \frac{1}{36} \right)$   
 $\frac{1}{8} = 0 \text{ da. } 16 \text{ ho. } 50 \text{ m. } 0 \text{ sec.}$   
 $\frac{1}{8} = 0 \quad \quad \quad 2 \quad \quad \quad 48 \quad \quad \quad 20$   
 $\underline{5 \text{ da. } 0 \text{ ho. } 38 \text{ m. } 20 \text{ sec.}} \quad \text{Ans.}$

(12)  $\frac{3}{4}$  of  $30d. = 90d. \div 4 = 1s. \ 10\frac{1}{2}d.$   
 $\frac{1}{14}$  of  $21s. = 3s. \div 2 = 1 \ 6$   
 $\text{Amount to be subtracted, } \underline{3s. \ 4\frac{1}{2}d.}$

$$\begin{array}{r}
 10s. \ 6d. \times \left(2 - \frac{2}{9}\right) \\
 \hline
 9 \overline{) 21 \ 0} \\
 \underline{2 \ 4} \\
 18s. \ 8 + \mathcal{L} \frac{1}{12} = 18s. \ 8d. + 1s. \ 8d. = 20s. \ 4d. \\
 20s. \ 4d. - 3s. \ 4\frac{1}{2}d. = 16s. \ 11\frac{1}{2}d. \quad \text{Ans.}
 \end{array}$$

$$(13) \quad \frac{5}{8} \text{ of } (21s. + 5s. + 72s. \ 6d.) = \frac{5}{8} \text{ of } 98s. \ 6d.$$

$$\begin{array}{r}
 \text{Ans. } \mathcal{L}3 \ 1s. \ 6\frac{3}{4}d. \\
 8 \overline{) 492 \ 6} \\
 \underline{61s. \ 6\frac{3}{4}d.}
 \end{array}$$

$$(14) \quad \frac{1}{4} \text{ of } (21s. - 2d.) + \frac{1}{8} \text{ of } 5s. + \frac{1}{5} \text{ of } 7s. \ 6d. = 7s. \ 4d.$$

$$\begin{array}{r}
 \text{Ans. } \mathcal{L}1 \ 2s. \\
 \underline{22s. \ 0d.}
 \end{array}$$

$$(15) \quad \frac{12}{5} \text{ of } \frac{7}{4} \text{ of } \frac{35}{4}d. = \frac{1}{4} \text{ of } 147d.$$

$$\frac{11}{3} \text{ of } \frac{21}{11} \text{ of } \frac{3}{14} \text{ of } \frac{9}{2}d. = \frac{1}{4} \text{ of } 27d.$$

$$\frac{1}{4} \text{ of } 174d. = 43\frac{1}{2}d. = 3s. \ 7\frac{1}{2}d. \quad \text{Ans.}$$

$$(16) \quad \left(\frac{30}{7} + \frac{24}{7} + \frac{1}{7}\right) \text{ of } \mathcal{L}1 = \mathcal{L}\frac{55}{7}; \text{ and } \frac{2}{3} \text{ of } \frac{3}{7}s. = \frac{2}{7}s.;$$

$$\text{hence, } \frac{1}{7} \text{ of } \mathcal{L}55 \ 2s. = \mathcal{L}7 \ 17s. \ 5\frac{1}{2}d. \quad \text{Ans.}$$

**Ex. 34.** (p. 52.)

$$(1) \ 1d. = \text{a } 240\text{th of } \mathcal{L}1; \therefore 40d. = \frac{40}{240} = \frac{1}{6} \text{ of it. } \text{Ans.}$$

$$1hf. \ d. = \text{a } 12\text{th of } 6d.; \therefore 61hf. \ d. = \frac{61}{12} = 5\frac{1}{12} \text{ of it. } \text{Ans.}$$

$$(2) \ 1sixp. = \text{a } 529\text{th of } \mathcal{L}13 \ 4s. \ 6d.; \therefore 299sixp. = \frac{299}{529} = \frac{13}{23} \text{ of it. } \text{Ans.}$$

$$1f. = \frac{1}{7} \text{ of } 1\frac{3}{4}d.; \therefore 322f. = \frac{322}{7} = 46 \text{ of it. } \text{Ans.}$$

(3) 1 qr. = a 13th of 3 cwt. 1 qr.;  $\therefore 3\frac{1}{2}$  qrs. =  $\frac{7}{26}$  of it. *Ans.*

1 qr. = a  $61\frac{5}{7}$ th of 15 cwt. 1 qr. 20 lbs.;  $\therefore 96$  qrs. =  $\frac{672}{432} = \frac{14}{9} = 1\frac{5}{9}$  of it. *Ans.*

(4) 1s. = a  $23\frac{3}{8}$ th of £1 3s.  $4\frac{1}{2}$ d.;  $\therefore 3\frac{5}{8}$ s. =  $\frac{29}{187}$  of it. *Ans.*

1s. = a 27th of 27s.;  $\therefore 87\frac{9}{18}$ s. =  $\frac{29\frac{3}{18}}{9} = 3\frac{35}{144}$  of it. *Ans.*

(5) 1 lb. = a 2240th of a ton;  $\therefore 395$  lb. =  $\frac{79}{448}$  of it. *Ans.*

1 hr. = an 84th of 3 da. 12 hrs.;  $\therefore 14\frac{1}{4}$  hrs. =  $\frac{57}{336} = \frac{19}{112}$  of it. *Ans.*

(6) 1 po. = a 480th of 3 ac.;  $\therefore 93$  po. =  $\frac{31}{160}$  of it. *Ans.*

1d. = an 80th of 6s. 8d.;  $\therefore 420$ d. =  $\frac{21}{4} = 5\frac{1}{4}$  of it. *Ans.*

(7) 1 qr. = a  $15\frac{3}{4}$ th of 3 cwt. 3 qrs. 21 lbs.;  $\therefore 80$  qrs. =  $\frac{320}{63} = 5\frac{5}{63}$  of it. *Ans.*

1 yd. = a  $(68 \times 5\frac{1}{2})$ th of 1 f. 28 po.;  $\therefore 170$  yds. =  $\frac{5}{2 \times 5\frac{1}{2}} = \frac{5}{11}$  of it. *Ans.*

(8) 1 min. = a 30th of 30 min.;  $\therefore 30256$  min. =  $1008\frac{8}{15}$  of it. *Ans.*

1 pk. = a 140th of 4 qrs. 3 bu.;  $\therefore 96\frac{1}{4}$  pks. =  $\frac{385}{560} = \frac{11}{16}$  of it. *Ans.*

(9) 1 ro. = an  $8\frac{1}{2}$ th of 2 ac. 32 po.;  $\therefore 35$  ro. =  $3\frac{43}{44}$  of it. *Ans.*

1 ft. = a 3rd of a yard;  $\therefore 1\frac{1}{8}$  ft. =  $\frac{6}{15} = \frac{2}{5}$  of it. *Ans.*

(10) 1 hr. = a 24th of a day;  $\therefore 7\frac{1}{2}$  hrs. =  $\frac{36}{120} = \frac{3}{10}$  of it. *Ans.*

1s. = a  $29\frac{5}{18}$ th of £1 9s.  $3\frac{3}{4}$ d.;  $\therefore 92\frac{2}{18}$ s. =  $\frac{1474}{469} = \frac{134 \times 11}{67 \times 7} = \frac{22}{7} = 3\frac{1}{7}$  of it. *Ans.*

- (11) 1 lb. = a  $42\frac{1}{2}$ th of 1 qr.  $14\frac{1}{2}$  lbs.;  $\therefore 17$  lbs. =  $\frac{34}{85} = \frac{2}{5}$  of it. *Ans.*  
 1 yd. = a  $3\frac{1}{3}$  rd. of 3 yds. 1 ft.;  $\therefore 220 \times 12$  yds. =  $22 \times 36 = 792$  of it. *Ans.*
- (12) 3 sq. po.  $13\frac{1}{2}$  yds. =  $90\frac{3}{4} + 13\frac{1}{2} = 104$  sq. yds.  
 1 sq. ft. = a  $937\frac{1}{2}$ th of 104 sq. yds.  $1\frac{1}{2}$  ft.;  $\therefore 20\frac{5}{8}$  sq. ft. =  $\frac{125}{5625} = \frac{1}{45}$  of it. *Ans.*  
 1 cwt. = a  $42\frac{1}{2}$ th of 2 tons  $2\frac{1}{2}$  cwt.;  $\therefore 3\frac{1}{8}$  cwt. =  $\frac{25}{340} = \frac{5}{68}$  of it. *Ans.*
- (13) 1s. = a  $73\frac{1}{2}$ th of £3 13s. 6d.;  $\therefore 453\frac{11}{16}$ s. =  $\frac{7259}{147 \times 8} = \frac{1037}{21 \times 8}$   
 =  $6\frac{29}{168}$  of it. *Ans.*  
 1s. = a  $23\frac{7}{16}$ th of £1 3s.  $5\frac{1}{4}$ d.;  $\therefore 76\frac{3}{16}$ s. =  $\frac{1225}{375} = \frac{49}{15} = 3\frac{4}{15}$  of it. *Ans.*
- (14) 3000 in. = 250 ft.; and 45 po. =  $16\frac{1}{2}$  ft.  $\times 45$ ;  
 1 ft. = a  $(16\frac{1}{2} \times 45)$ th of 1 fur. 5 po.;  $\therefore 250 = \frac{500}{33 \times 45} = \frac{100}{297}$  of it. *Ans.*  
 1s. = a  $24\frac{3}{16}$ th of £1 4s.  $2\frac{1}{4}$ d.;  $\therefore 40\frac{5}{16}$ s. =  $\frac{645}{387} = \frac{5}{3} = 1\frac{2}{3}$  of it. *Ans.*
- (15) 1guin. =  $1\frac{1}{20}$  of a £;  $\therefore$  also  $1\frac{1}{20}$ guin. =  $1\frac{1}{20}$  of £1 $\frac{1}{2}$ . *Ans.*  
 1d. = a 2464th of £10 5s. 4d.;  $\therefore 2717$ d. =  $\frac{247}{224} = 1\frac{23}{224}$  of it. *Ans.*
- (16) 1s. = a  $32\frac{13}{16}$ th of £1 12s.  $9\frac{3}{4}$ d.;  $\therefore 18\frac{3}{4}$ s. =  $\frac{75 \times 4}{525} = \frac{4}{7}$  of it. *Ans.*  
 1s. = a  $10\frac{15}{16}$ th of 10s.  $11\frac{1}{4}$ d.;  $\therefore \frac{8}{3}$  of  $\frac{21}{2}$ s. =  $\frac{8}{3} \times \frac{21}{2} \times \frac{16}{175} = \frac{64}{25} = 2\frac{14}{25}$  of it. *Ans.*

## EX. 35. (p. 53.)

- (1) £1 =  $\frac{20}{21}$  guin.;  $\therefore \frac{\text{£}^3}{8} = \frac{3}{8}$  of  $\frac{20}{21} = \frac{5}{14}$  guin. *Ans.*  
 1s. =  $\frac{\text{£}^1}{20}$ ;  $\therefore \frac{7}{4}$ s. =  $\frac{7}{4}$  of  $\frac{1}{20} = \frac{\text{£}^7}{80}$ . *Ans.*



- (2)  $\frac{2}{3}d. \div 15s. = 2d. + 45s. = 2d. \div 540d. = \frac{1}{270}. \text{ Ans.}$   
 $3\frac{1}{2}s. \times 12\frac{3}{4} + 20s. = 7 \times 51 + (20 \times 8) = 357 + 160 = 2\frac{37}{160}. \text{ Ans.}$
- (3)  $\frac{5}{9}$  of  $1\frac{1}{2}s. \div 1s. = \frac{5 \times 3}{9 \times 2} = \frac{5}{6}. \text{ Ans.}$   
 $\frac{6}{7}$  of  $\frac{1}{2}s. + 20s. = 6 + (20 \times 14) = \frac{3}{140}. \text{ Ans.}$
- (4)  $3\frac{1}{2}$  of  $\pounds 1\frac{1}{6} + \pounds 5 = 7 \times 7 \div (5 \times 12) = \frac{49}{60}. \text{ Ans.}$   
 $2\frac{2}{3}$  of  $210\frac{1}{2}d. + 120d. = 421 \times 8 \div (120 \times 6) = 421 \div 90 = 4\frac{61}{90}. \text{ Ans.}$
- (5)  $3\frac{1}{7}$  of  $1\frac{3}{4}$  cwt.  $\div 20$  cwt.  $= 7 \times 22 \div (20 \times 28) = \frac{11}{40}. \text{ Ans.}$   
 $3\frac{3}{7}$  da.  $\div 3$  wks.  $= 3\frac{3}{7}$  da.  $\div 21$  da.  $= 24 \div (21 \times 7) = \frac{8}{49}. \text{ Ans.}$
- (6)  $1\frac{1}{4}$  of  $73\frac{1}{2}s. + 10\frac{1}{2}s. = 147 \times 5 + (21 \times 4) = 7 \times 5 + 4 = 8\frac{3}{4}. \text{ Ans.}$   
 $2\frac{2}{5}$  of  $120s. \div 33s. = 24 \times 12 \div 33 = 96 + 11 = 8\frac{8}{11}. \text{ Ans.}$
- (7)  $2\frac{4}{9}$  of  $448$  lb.  $\div 88$  lb.  $= 448 \times 22 \div (88 \times 9) = 56 \times 2 \div 9 = 12\frac{4}{9}. \text{ Ans.}$   
 $4\frac{7}{8}$  crs.  $\div 5$  guin.  $= 5s. \times 4\frac{7}{8} \div (21s. \times 5) = 39 + (21 \times 8) = \frac{13}{56}. \text{ Ans.}$
- (8)  $\frac{5}{8}$  lb. Tr.  $\div 1$  lb. Av.  $= 5760$  grs.  $\times \frac{5}{8} \div 7000$  grs.  $= 72 \times 5 \div 700$   
 $= 36 \div 70 = \frac{18}{35}. \text{ Ans.}$   
 $\frac{5}{9}$  po.  $\div 1$  fath.  $= 5\frac{1}{2}$  yds.  $\times \frac{5}{9} \div 2$  yds.  $= 11 \times 5 \div (2 \times 18) = 55 \div 36$   
 $= 1\frac{19}{36}. \text{ Ans.}$
- (9)  $\frac{3}{8}$  sq. ft.  $\div 1$  sq. po.  $= \frac{3}{8}$  sq. ft.  $\div (9$  sq. ft.  $\times 30\frac{1}{4}) = 3 + (9 \times 242) = \frac{1}{726}. \text{ Ans.}$   
 $12\frac{5}{6}$  of  $1\frac{1}{8}$  qr.  $+ 88$  qrs.  $= 9 \times 77 \div (88 \times 48) = 3 \times 7 + (8 \times 16) = \frac{21}{128}. \text{ Ans.}$

$$(10) \quad 3\frac{1}{2} \text{ of } 11 \text{ ro.} \div 2\frac{1}{16} \text{ ro.} = 11 \times 7 \times 8 \div 33 = 56 + 3 = 18\frac{2}{3}. \text{ Ans.}$$

$$1\frac{3}{17} \text{ of } 44\frac{5}{8} \text{ s.} + 5 \text{ s.} = 357 \times 20 \div (5 \times 8 \times 17) = 21 \div 2 = 10\frac{1}{2}. \text{ Ans.}$$

$$(11) \quad 24 \text{ da.} + 32\frac{5}{8} \text{ hrs.} = 24 \text{ hrs.} \times 24 \div 32\frac{5}{8} \text{ hrs.} = 24 \times 24 \times 8 \div 261$$

$$= 8 \times 8 \times 8 + 29 = 17\frac{19}{29}. \text{ Ans.}$$

$$2\frac{4}{9} \text{ of } 45 \text{ yds.} \div 10 \text{ mi.} = 5 \text{ yds.} \times 22 \div 17600 \text{ yds.} = 5 + 800 = \frac{1}{160}. \text{ Ans}$$

$$(12) \quad 2\frac{2}{3} \text{ of } 126 \text{ po.} + 243 \text{ po.} = 42 \times 8 + 243 = 14 \times 8 + 81 = 1\frac{31}{81}. \text{ Ans.}$$

$$\frac{3}{8} \text{ of } \frac{3}{2} \text{ of } 10\frac{5}{8} \text{ s.} + 84\frac{3}{8} \text{ s.} = 3 \times 3 \times 85 \div (675 \times 16) = 17 \div (15 \times 16) = \frac{17}{240}. \text{ Ans.}$$

$$(13) \quad 33\frac{1}{4} \text{ of } 3 \text{ qrs.} \div 3\frac{3}{4} \text{ t.} = 33\frac{1}{4} \text{ qrs.} + 1\frac{1}{4} \text{ t.} = 133 \text{ qrs.} + 5 \text{ t.}$$

$$= 133 \text{ qrs.} + 400 \text{ qrs.} = \frac{133}{400}. \text{ Ans.}$$

$$3\frac{3}{4} \text{ of } 1\frac{3}{5} \text{ ac.} + 2\frac{1}{64} \text{ ac.} = 8 \times 15 \times 16 \div (129 \times 5) = 8 \times 16 \div 43$$

$$= 2\frac{42}{43}. \text{ Ans.}$$

$$(14) \quad 7\frac{1}{5} \text{ of } 522\frac{1}{2} \text{ d.} \div 90 \text{ d.} = 1045 \times 36 \div 900 = 209 \times 4 \div 20 = 41\frac{4}{5}. \text{ Ans.}$$

$$\frac{15}{8} \text{ s.} + \frac{4}{5} \text{ s.} = \frac{75 + 32}{40} \text{ s.} = \frac{107}{40} \text{ s.}; \therefore \frac{107}{40} \text{ s.} \div 21 \text{ s.} = \frac{107}{840}. \text{ Ans.}$$

$$(15) \quad 4\frac{1}{5} \text{ of } 643\frac{3}{4} \text{ d.} \div 656\frac{1}{4} \text{ d.} = 2575 \times 21 \div (2625 \times 5) = 515 \div 125$$

$$= 103 + 25 = 4\frac{3}{25}. \text{ Ans.}$$

$$1\frac{2}{7} \text{ of } 481\frac{1}{4} \text{ d.} \div 506\frac{1}{4} \text{ d.} = 1925 \times 9 \div (2025 \times 7) = 275 \div 225$$

$$= 11 + 9 = 1\frac{2}{9}. \text{ Ans.}$$

$$(16) \quad \frac{242}{35} \text{ of } 365\frac{3}{4} \text{ d.} + 756\frac{1}{4} \text{ d.} = 1463 \times 242 \div (3025 \times 35)$$

$$= 209 \times 22 \div (275 \times 5) = 418 \div (25 \times 5) = 3\frac{43}{125}. \text{ Ans.}$$

$$\begin{aligned} \frac{7}{9} \text{ of } 20s. - \frac{2}{5} \text{ of } 21s. &= \frac{140}{9}s. - \frac{42}{5}s. = \frac{322}{45}s.; \\ \frac{322}{45}s. + \frac{21}{2}s. &= 644 + 945 = \frac{92}{135}. \quad \text{Ans.} \end{aligned}$$


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## MISCELLANEOUS EXAMPLES.

**Ex. 36.** (p. 54.)

- (1) L. C. M. of the numerators = 42;  
 $\frac{2}{13}, \frac{7}{45}, \frac{3}{20} = \frac{42}{273}, \frac{42}{270}, \frac{42}{280}$ ; hence the 2nd is the greatest, and  
 the 3rd is the least. *Ans.*
- (2)  $\left(\frac{1}{4} + \frac{1}{3} + \frac{3}{20}\right) \div \left(\frac{1}{4} - \frac{1}{5}\right) = \frac{15+20+9}{60} \div \frac{15-12}{60} = 44 \div 3 = 14\frac{2}{3}$ .  
*Ans.*
- (3)  $\frac{8}{5} - \frac{14}{27} = \frac{216-70}{135} = \frac{146}{135} = 1\frac{11}{135}$ . *Ans.*  
 $\frac{49}{27} - \frac{11}{15} = \frac{245-99}{135} = \frac{146}{135} = 1\frac{11}{135}$ . *Ans.*
- (4)  $\frac{2}{5}$  of  $\frac{17}{7}$  and  $\frac{7}{9}$  of  $\frac{5}{4} = \frac{34}{35}$  and  $\frac{35}{36} = \frac{1224}{1260}$  and  $\frac{1225}{1260}$ ;  
 $\therefore$  the latter quantity is greater by  $\frac{1}{1260}$ . *Ans.*
- (5)  $10\frac{1}{10} \div \left(10 - \frac{1}{10}\right) = \frac{101}{10} \div \frac{99}{10} = \frac{101}{99}$ ;  
 also,  $99 + 101 = \frac{99}{101}$ ; then,  $\frac{101}{99} \div \frac{99}{101}$   
 $= \frac{10201 \div 9999}{9999} = \frac{20002}{9999}$  and  $\frac{400}{9999}$ . *Ans.*
- (6)  $\pounds \frac{27}{8} \times \frac{3}{5} + \pounds \frac{21}{20} \times \frac{9}{2} \times \frac{1}{6} = \pounds \frac{81}{40} + \pounds \frac{63}{80} = \pounds \frac{225}{80}$ ;  
 then,  $\pounds \frac{225}{80} \times \frac{7}{75} = \pounds \frac{21}{80} = \frac{21}{80}s. = 5s. 3d.$  *Ans.*
- (7) First,  $\frac{1}{2}$  will remain; then,  $\frac{2}{3}$  of  $\frac{1}{2}$ , or  $\frac{1}{3}$ , will remain; and  
 lastly,  $\frac{3}{4}$  of  $\frac{1}{3}$ , or  $\frac{1}{4}$ , will remain. *Ans.*

$$\begin{aligned}
 (8) \quad \frac{10}{11} + \frac{2}{33} + \frac{11}{14} + \frac{41}{42} &= \frac{32}{33} + \frac{37}{21} = 1 + \frac{32}{33} + \frac{16}{21}; \\
 &= 1 + \left( \frac{2}{33} + \frac{1}{21} \right) \times 16 = 1 + \frac{25 \times 16}{231} = 2 \frac{169}{231}; \\
 \text{then, } 3 - 2 \frac{169}{231} &= \frac{62}{231}. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (9) \quad \text{The length} \times 15 \frac{3}{4} \text{ ft. is to produce } 9 \times 46 \text{ sq. ft.;} \\
 \therefore \text{ the length must be } = 9 \times 46 \div 15 \frac{3}{4} = 46 \div \frac{7}{4} = 184 \div 7 \\
 = 26 \frac{2}{7} \text{ ft.} \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (10) \quad \frac{3}{4} + \frac{7}{10} + \frac{3}{4} - \frac{7}{10} + \frac{3 \times 7}{4 \times 10} + \frac{3 \times 10}{4 \times 7} &= \frac{3}{2} + \frac{21}{40} + \frac{15}{14} \\
 &= \frac{420 + 147 + 300}{280} = \frac{867}{280} = 3 \frac{27}{280}. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (11) \quad \frac{3}{4} \text{ lb. Tr.} &= \frac{3}{4} \text{ of } 12 \text{ oz.} = 9 \text{ oz.}; \text{ also, } \frac{1}{6} \text{ oz.} = \frac{1}{6} \text{ of } 20 \text{ dwt.} \\
 &= 3 \text{ dwt. } 8 \text{ grs.}; \therefore 9 \text{ oz. } 3 \text{ dwt. } 8 \text{ grs.} \quad \text{Ans.} \\
 \frac{23}{4} - \frac{3}{4} \text{ s.} &= \frac{3}{4} \text{ of } (20 \text{ s.} - 1 \text{ s.}) = 57 \text{ s.} + 4 = 14 \text{ s. } 3 \text{ d.} \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (12) \quad 2 \frac{5}{9} \times 5 \text{ qrs.} + 4 \text{ qrs.} &= 23 \times 5 + (4 \times 9) = 115 + 36 = 3 \frac{7}{36}. \quad \text{Ans.} \\
 43 \frac{1}{3} \text{ sq. in.} \times 2 \frac{1}{2} &= 216 \frac{2}{3} + 2 = 108 \frac{1}{3} \text{ sq. in.} \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (13) \quad &\frac{2}{3} \text{ of } £4 + \frac{4}{5} \text{ of } 3 \text{ guin.} \\
 &\frac{2}{3} \text{ of } £4 - \frac{4}{5} \text{ of } 3 \text{ guin.} \quad (\text{Comp. Solution of Qn. 43.}) \\
 \hline
 \text{Together} &= \frac{4}{3} \text{ of } £4 = £16 + 3 = £19 \text{ } 6 \text{ s. } 8 \text{ d.} \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (14) \quad \frac{7 \times 1 \frac{1}{2} \times \frac{3}{14} \times \frac{14}{9}}{\frac{1}{8} \times \frac{6}{7} \times 7} &= \frac{7 \times 1 \frac{1}{2} \times \frac{3}{14} \times 14}{9} = \frac{7 \times 1 \frac{1}{2} \times 3}{9} = 3 \frac{1}{2}. \quad \text{Ans.} \\
 \left( \frac{1}{2} + \frac{1}{3} + \frac{1}{4} \right) + \left( \frac{2}{5} + \frac{2}{7} + \frac{2}{9} \right) &= \frac{13}{12} + \frac{143 \times 2}{315} \\
 = \frac{13}{12} \times \frac{315}{13 \times 11 \times 2} &= \frac{105}{88} = 1 \frac{17}{88}. \quad \text{Ans.}
 \end{aligned}$$

$$(15) \quad \frac{4}{15} \text{ of } 12 + \frac{13}{24} \text{ of } 300 = 3\frac{1}{5} + 162\frac{1}{2} = 165\frac{7}{10}$$

$$\frac{15}{4} \text{ of } 100 - 43\frac{3}{5} = 375 - 43\frac{3}{5} = 331\frac{2}{5}$$

$$\frac{1657}{10} \div \frac{1657}{5} = \frac{5}{10} = \frac{1}{2}. \text{ Ans.}$$

$$(16) \quad \left(1\frac{1}{2} + \frac{2}{3} + \frac{3}{4}\right) \times \left(\frac{4}{15} - \frac{3}{20}\right) + 43\frac{5}{9} = \frac{35}{12} \times \frac{7}{60} \times \frac{9}{392} = \frac{1}{128}. \text{ Ans.}$$

$$(17) \quad \left(\frac{1}{2} - \frac{1}{3} - \frac{1}{24} + \frac{1}{2} \times \frac{1}{3} \times \frac{1}{24}\right) \times \frac{144}{19} = \left(\frac{1}{8} + \frac{1}{144}\right) \times \frac{144}{19}$$

$$= \frac{18}{19} + \frac{1}{19} = 1. \text{ Ans.}$$

$$(18) \quad 3\frac{2}{3} + 4\frac{3}{4} + 4\frac{4}{5} = 11 + \frac{133}{60} = \frac{793}{60};$$

$$7\frac{6}{7} - 5\frac{5}{6} = 2 + \frac{6}{7} - \frac{5}{6} = 2\frac{1}{42} = \frac{85}{42};$$

$$94\frac{1}{8} + 93\frac{1}{9} = 187\frac{17}{72};$$

$$\frac{793}{60} \times \frac{85}{42} \div 187\frac{17}{72} = \frac{793}{12} \times \frac{1}{42} \div 11\frac{1}{72};$$

$$= \frac{793}{12} \times \frac{1}{42} \times \frac{72}{793} = \frac{6}{42} = \frac{1}{7}. \text{ Ans.}$$

$$(19) \quad 2 + \left(2\frac{2}{3} + \frac{4}{5} + 4\right) = 1 + \left(3\frac{1}{3} + \frac{2}{5}\right) = 15 + (50 + 6);$$

$$\text{also, } \frac{15}{9} - \frac{7}{9} = \frac{8}{9}; \text{ and } 5\frac{1}{5} - 4\frac{1}{2} = 1 - \frac{1}{2} + \frac{1}{5} = \frac{7}{10};$$

$$\left(\frac{15}{56} + \frac{8}{9}\right) \times \frac{7}{10} = \frac{15}{80} + \frac{56}{90} = \frac{135 + 448}{720} = \frac{583}{720}. \text{ Ans.}$$

$$(20) \quad \left(\frac{1}{2} + \frac{1}{3}\right) \times \left(\frac{4}{3} + \frac{11}{4}\right) \times \left(\frac{29}{14} - \frac{3}{2}\right) \times \left(\frac{31}{10} - \frac{3}{7}\right)$$

$$= \frac{5}{6} \times \frac{49}{12} \times \frac{4}{7} \times \frac{187}{70} = \frac{187}{36} = 5\frac{7}{36}. \text{ Ans.}$$

$$1\frac{3}{4} + 2\frac{1}{2} + 5\frac{1}{2} + 3\frac{1}{8} = \frac{7}{4} \times \frac{2}{5} + \frac{11}{2} \times \frac{8}{25} = \frac{7}{10} + \frac{44}{25}$$

$$\frac{35 + 88}{50} = 2\frac{23}{50}. \text{ Ans.}$$

$$(21) \quad \frac{7}{54} \text{ of } £518 \text{ } 10s. = £3629 \text{ } 10s. \div (6 \times 9) = £67 \text{ } 4s. \text{ } 3\frac{1}{2}d. \text{ Ans.}$$

$$(22) \quad \pounds \frac{5}{12} \pm \frac{3}{4} \text{ cr.} = \frac{5}{6} \text{ hf. sov.} \pm \frac{3}{8} \text{ hf. sov.} = \frac{20 \pm 9}{24} \\ = \frac{29}{24} \text{ and } \frac{11}{24}. \text{ Ans. Also, } \frac{29}{24} \div \frac{11}{24} = \frac{29}{11} = 2 \frac{7}{11}. \text{ Ans.}$$

$$(23) \quad \frac{125}{8} \text{ s.} \times \frac{768}{7} = \frac{125 \times 96}{7} = 1714 \frac{2}{7} \text{ s.} = \pounds 85 \text{ 14s. } 3 \frac{2}{7} \text{ d. Ans.} \\ \pounds 61 \quad 4\text{s. } 7 \frac{5}{16} \text{ d.} + \frac{267 \frac{3}{16}}{16} \\ \pounds 979 \text{ 13s. } 9 \text{ d.} + 4275 = 4\text{s. } 7 \text{ d. Ans.}$$

$$(24) \quad 2 \frac{1}{2} \text{ s.} \div \frac{4}{7} \text{ s.} = \frac{5}{2} \times \frac{7}{4} = \frac{35}{8}, \text{ or } 4 \frac{3}{8} \text{ times. Ans.} \\ 21\text{s.} \times 24 + 12\text{s.} = 21 \times 2 = 42 \text{ times. Ans.}$$

$$(25) \quad \pounds \frac{125}{96} \times \frac{411}{25} = \frac{5 \times 137}{32} = \pounds 21 \text{ 8s. } 1 \frac{1}{2} \text{ d. Ans.}$$

$$(26) \quad \pounds 3740 + \frac{3}{8} = \pounds 29920 + 3 = \pounds 9973 \text{ 6s. } 8 \text{ d. Ans.}$$

$$(27) \quad \pounds \frac{1}{16} = \frac{20}{16} \text{ s.} = \frac{5}{4} \text{ s.}; \frac{1}{20} \text{ guin.} = \frac{21}{20} \text{ s.}; \frac{6}{25} \text{ cr.} = \frac{6}{5} \text{ s.}; \\ \frac{5}{4}, \frac{21}{20}, \text{ and } \frac{6}{5} = \frac{25, 21, \text{ and } 24}{20}. \text{ Ans.}$$

$$(28) \quad \frac{\frac{45}{8} \times \frac{3}{2}}{\frac{2}{3} \times \frac{3}{31}} \times \frac{3 \times 37 \times 8}{5 \times 111 \times 16 \times 3} = \frac{45 \times 3 \times 31}{2 \times 8 \times 2} \times \frac{1}{30} = \frac{279}{64} = 4 \frac{23}{64}. \text{ Ans.}$$

$$(29) \quad \text{Worth of the estate} = \pounds 220 \div \frac{2}{3}; \therefore \frac{3}{11} \text{ of } \pounds 220 \times \frac{3}{2} = \pounds 90. \text{ Ans.}$$

$$(30) \quad \frac{3}{8} \text{ lb. Tr. and } \frac{3}{8} \text{ lb. Av.} = \frac{3}{8} \text{ lb. Tr. and } \frac{7000}{5760} \text{ of } \frac{3}{8} \text{ lb. Tr.}; \\ \therefore \text{the difference is} = \frac{1240}{5760} \text{ of } \frac{3}{8} \text{ lb. Tr.} = \frac{31}{48} \text{ of } \frac{1}{8} \text{ of } \frac{240}{1} \text{ dwt.} \\ = 155 \div 8 = 19 \text{ dwt. } 9 \text{ grs. Ans.}$$

$$(31) \quad \left( 12 \frac{5}{6} - 8 \frac{3}{4} - 1 \frac{1}{10} + \frac{8}{15} \right) \times \frac{9}{2} \times \left( 7 \frac{5}{12} - 6 \frac{1}{2} \right) \\ = \left( 3 \frac{5}{6} + \frac{8}{15} - \frac{3}{4} - \frac{1}{10} \right) \times \frac{9}{2} \times \left( 1 - \frac{1}{2} + \frac{5}{12} \right) \\ = \frac{211}{60} \times \frac{9}{2} \times \frac{11}{12} = \frac{2321}{160} = 14 \frac{81}{160}. \text{ Ans.} \\ \frac{2}{3} \times \frac{7}{12} - \frac{5}{8} \times \frac{11}{35} = \frac{7}{18} - \frac{11}{56} = \frac{196 - 99}{504} = \frac{97}{504}. \text{ Ans.}$$

$$(32) \quad \frac{1}{21} \text{ of } 60 \text{ hf. d., } \frac{1}{24} \text{ of } 80 \text{ hf. d., and } \frac{1}{28} \text{ of } 101 \text{ hf. d.}$$

$$= \frac{20}{7} \text{ hf. d., } \frac{10}{3} \text{ hf. d., and } \frac{101}{28} \text{ hf. d.}$$

$$= \frac{240, 280, \text{ and } 303}{84}. \text{ Ans.}$$

$$(33) \quad £7 \frac{4}{5} - £7 \times \frac{4}{5} = 7 \frac{4}{5} - 5 \frac{3}{5} = £2 \frac{1}{5};$$

$$£2 \frac{1}{5} \div £5 = 11 + 25 = \frac{11}{25}. \text{ Ans.}$$

$$£14 \frac{14}{15} \times \frac{11}{21} = £2 \frac{2}{15} \times \frac{11}{3} = £ \frac{32 \times 11}{15 \times 3} = £7 \text{ 16s. } 5 \frac{1}{3} \text{d. Ans.}$$

$$(34) \quad \text{He still owes } \frac{1}{2} + \frac{1}{4} + \frac{1}{5} + \frac{1}{20} = \frac{20}{20} \text{ of } 1 \text{ guin.} = 1 \text{ guin. Ans.}$$

$$(35) \quad 3 \frac{2}{9} \text{ lbs. Tr.} + \frac{7000}{5760} \text{ of } 16 \frac{1}{3} \text{ lbs. Tr.} = \frac{29}{9} + \frac{175}{144} \times \frac{49}{3}$$

$$= \frac{1392 + 8575}{432} = \frac{9967}{432} \text{ lbs.} = 23 \text{ lbs. } 17 \text{ dwt. } 5 \frac{1}{3} \text{grs. Ans.}$$

$$(36) \quad \frac{5 \frac{3}{4} - 2 \frac{1}{8}}{3 \frac{3}{4} + \frac{9}{20}} = \frac{232 - 85}{150 + 18} = \frac{147}{168} = \frac{7}{8};$$

$$\frac{4 \frac{1}{2} + 5 \frac{19}{25}}{4 \frac{1}{20}} = \frac{450 + 576}{405} = \frac{1026}{405} = \frac{38}{15};$$

$$\frac{2 \frac{3}{8} + 1 \frac{1}{8}}{7 \frac{19}{24} - 2 \frac{1}{4}} = \frac{31 \frac{1}{2} + 20}{93 \frac{1}{2} - 27} = \frac{312 + 200}{935 - 270} = \frac{512}{665};$$

$$\frac{7}{8} \text{ of } \frac{38}{15} \text{ of } \frac{512}{665} = \frac{128}{75} = 1 \frac{53}{75}. \text{ Ans.}$$

$$(37) \quad 1 \text{ ton is worth } 90\text{s.} + \frac{3}{16}, \therefore \frac{1}{5} \text{ ton is worth } 18\text{s.} \div \frac{3}{16}$$

$$= 18\text{s.} \times \frac{16}{3} = 96\text{s.} = £4 \text{ 16s. Ans.}$$

$$(38) \quad \text{Remainder} = \frac{3}{5} \text{ of the original sum; and } \frac{2}{3} \text{ of } \frac{3}{5} = \frac{2}{5} \text{ of that sum}$$

$$= 13\text{s. } 5 \frac{1}{2} \text{d.; } \therefore \text{the original sum was } 13\text{s. } 5 \frac{1}{2} \text{d.} + \frac{2}{5}$$

$$= 33\text{s. } 7 \frac{3}{4} \text{d. Ans.}$$

$$(39) \quad \left( 29 \frac{1}{2} \times 11 \frac{1}{4} \right) \div 9 = \frac{59 \times 5}{8} \text{ sq. yds.} = \text{length of carpet} \times \text{its breadth;}$$

$$\therefore \frac{59 \times 5}{8} \div \frac{5}{8} = 59 \text{ yds. length of carpet. Ans.}$$

$$59 \text{ yds. at } 3\text{s. } 9\text{d. a yd.} = £11 \text{ 1s. } 3\text{d. Ans.}$$

(40) He has remaining  $\frac{5}{8}$  of  $\frac{5}{16} = \frac{25}{128}$ . *Ans.*

$$\frac{25}{128} \text{ of } £16000 = £3125. \text{ Ans.}$$

(41) 4 bu. 1 pk. 1 gal. 2 qts.  $\div$  1 qr.  $= 35\frac{1}{2}$  gal. + 64 gal.  $= \frac{71}{128}$ . *Ans.*

$$5 \text{ cwt.} = 560 \text{ lbs. Av.} = 7000 \text{ grs.} \times 560;$$

$$\frac{7000 \times 560}{5760} = \frac{6125}{9} = 680\frac{5}{9} \text{ lbs. Tr. Ans.}$$

(42) Whole ship worth £36 10s.  $7\frac{1}{2}d. \times 8 = £292 \text{ 5s.};$

$$£125\frac{1}{4} + £292\frac{1}{4} = 501 \div 1169 = \frac{3}{7}. \text{ Ans.}$$

(43) Here it is easily perceived that the first is the greater quantity, and as the sum of any two quantities added to their difference gives twice the greater, we have  $\frac{63}{20} \times \frac{110}{7} \times 2 = 99$ . *Ans.*

(Compare *Solution of Qn. 13.*)

(44) 4 persons pay 1318*d.*  $\therefore$  each pays  $\frac{1}{4}$  of that; and the whole number is  $= 2965\frac{1}{2}d. + \frac{1}{4}$  of 1318*d.*  $= 11862 + 1318 = 9$  persons. *Ans.*

(45)  $\frac{1}{11}$  lb. Tr. +  $\frac{1}{11}$  lb. Av.  $= \frac{1}{11}$  of (1 lb. Tr. +  $\frac{7000}{5760}$  of 1 lb. Tr.)

$$= \frac{12760}{5760 \times 11} \text{ lb. Tr.} = \frac{29}{144} \text{ lb. Tr.} = 2 \text{ oz. 8 dwt. 8 grs. Ans.}$$

$$\frac{5760}{7000} \text{ of } \frac{29}{144} \text{ lb. Av.} = \frac{29}{175} \text{ lb. Av.} = 2 \text{ oz. } 10\frac{74}{175} \text{ drs. Ans.}$$

(46)  $\left( 52 \text{ c. in.} \times 32 \times 13\frac{1}{2} \right) \div 34\frac{2}{3} \text{ c. in.} = \text{number of pints; which}$   
 $+ 8$  gives  $(52 \times 54 \times 3) + 104 = 27 \times 3 = 81 \text{ gal. Ans.}$

(47)  $\frac{7}{4} + \frac{8}{3} + \frac{7}{2} = \frac{21 + 32 + 42}{12} = \frac{95}{12};$

$$\frac{95}{12} \times \frac{7}{4} \times \frac{8}{3} \times \frac{7}{2} = \frac{4655}{36};$$

$$\frac{4655}{36} - \frac{8}{3} + \frac{3}{2} = \frac{4655 - 96 + 54}{36} = \frac{4613}{36};$$

$$\text{and since } \frac{11}{2} + \frac{4}{3} \text{ of } \frac{15}{4} \text{ is } = \frac{11}{2} + \frac{10}{2} = \frac{21}{2},$$

$$\therefore \frac{4613}{36} \times \frac{2}{21} = \frac{659}{18 \times 3} = 12\frac{11}{54}. \text{ Ans.}$$



$$(48) \text{ Circuit of wall} = \left(20\frac{3}{8} + 11\frac{1}{5}\right) \times 2 = 63\frac{3}{20} \text{ lineal ft.}$$

$$\therefore \text{ area of wall} = 63\frac{3}{20} \text{ sq. ft.} \times 12\frac{1}{2} = 789\frac{3}{8} \text{ sq. ft. of paper,}$$

$$= \left(789\frac{3}{8} + 9\right) \text{ sq. yds., which} + \frac{5}{8} \text{ yd. gives } 1263 + 9 = 140\frac{1}{3} \text{ lineal yds. of paper. } \textit{Ans.}$$

$$\frac{1263}{9} \text{ yds. at 9 farth.} = 1263f. = £1 \text{ 6s. } 3\frac{3}{4}d. \textit{ Ans.}$$

$$(49) 24 \text{ c. ft.} \times \frac{11}{4} \times \frac{5}{2} @ 11\frac{10}{11} \text{ lbs. per c. ft.}$$

$$= \frac{131 \times 6 \times 11 \times 5}{11 \times 2} = 1965 \text{ lbs.} = 17 \text{ cwt. 2 qrs. 5 lbs. } \textit{Ans.}$$

$$\text{Value,} = \frac{179}{45} \text{ s.} \times 24 \times \frac{11}{4} \times \frac{5}{2} = \frac{179 \times 11}{3} \text{ s.} = £32 \text{ 16s. 4d. } \textit{Ans.}$$

$$(50) \frac{1}{3} \text{ to the widow, } \frac{1}{2} \text{ to the son, } \therefore 1 - \frac{1}{3} - \frac{1}{2} = \frac{1}{6} \text{ to the daughter;}$$

$$\text{afterwards, the son was to have } \frac{1}{2} + \frac{3}{5} \text{ of } \frac{1}{3} = \frac{1}{2} + \frac{1}{5} = \frac{7}{10};$$

$$\text{in which case the daughter should have had } \frac{3}{10};$$

$$\text{but she actually received } \frac{1}{3}; \text{ and hence,}$$

$$\left. \begin{aligned} \text{her gain was} &= \frac{1}{3} - \frac{3}{10} = \frac{1}{30} \text{ of the whole,} \\ &= £10000 \div 30 = £333 \text{ 6s. 8d.} \end{aligned} \right\} \textit{Ans.}$$

## CHAPTER IV.

## DECIMAL FRACTIONS.

**Ex. 37.** (p. 58.)

$$(1) \quad \frac{7}{10} = .7. \quad \text{Ans.} \qquad \frac{117}{10} = 11\frac{7}{10} = 11.7. \quad \text{Ans.}$$

$$\frac{33}{100} = \frac{30+3}{100} = \frac{3}{10} + \frac{3}{100} = .33. \quad \text{Ans.}$$

$$\frac{1015}{1000} = 1\frac{15}{1000} = 1 + \frac{10+5}{1000} = 1 + \frac{1}{100} + \frac{5}{1000} = 1.015. \quad \text{Ans.}$$

$$(2) \quad \text{Answers: } .01; .0021; .0117; .0000003.$$

$$(3) \quad \text{Answer: } .230037.$$

$$(4) \quad \frac{11}{10} = 1\frac{1}{10} = 1.1$$

$$\begin{array}{rcl} 11 \text{ thousandths} & = & .011 \\ 11 \text{ hund.-thous.} & = & .00011 \\ & & \frac{1.11111}{1.11111} \text{ Ans.} \end{array}$$

$$(5) \quad \text{Answer: } 13.003005.$$

$$(6) \quad \text{Answer: } 10.110101.$$

$$(7) \quad \text{Answers: } \frac{37}{1000}; \frac{1}{5000}; \frac{1}{4}; \frac{3}{8}.$$

$$(8) \quad \text{Answers: } \frac{3}{400}; 1\frac{9}{40}; \frac{3}{16}; 3\frac{9}{40}.$$

$$(9) \quad \text{Answers: } \frac{11}{16000}; \frac{3}{3200}; 23\frac{61}{1600}.$$

$$(10) \quad \text{Answers: } 15\frac{13}{64}; \frac{3}{1280}; 4\frac{1}{128}.$$

$$(11) \quad \text{Answers: } 3; 300; .03; .0003; .125; 12.5; .0000125; .000000125; 5387340; .0538734.$$

$$(12) \quad \text{Answers: } 1100; 1100000; .0011; .0000011; 11025; 1102500; .011025; .00011025; 213012000; .000213012.$$

**Ex. 38.** (p. 59.)

(1) 11·275 ·34132 ·00414 ·0001 <u>23·001</u> <u>34·62156</u> <i>Ans.</i>	(2) 321·4 12·0 31·6154 ·01 2·214 <u>415·62</u> <u>782·8594</u> <i>Ans.</i>	(3) ·001213 45·613 234·0 ·0012 141·00056 <u>420·615973</u> <i>Ans.</i>	
(4) 1·0000123 31·1 117·154 2343·008 ·0002 <u>2492·2622123</u> <i>Ans.</i>	(5) 32·001 12·999 <u>19·002</u> <i>Ans.</i>  3·45 ·00098 <u>3·44902</u> <i>Ans.</i>	(6) 23·1415 2·008 <u>21·1335</u> <i>Ans.</i>  3·412 2·99987 <u>·41213</u> <i>Ans.</i>	
(7) 22·0001 2·9999 <u>19·0002</u> <i>Ans.</i> 2415·6 2414·5987 <u>1·0013</u> <i>Ans.</i>	(8) ·001 ·0009987 <u>·0000013</u> <i>Ans.</i> 24·004 ·987516 <u>23·016484</u> <i>Ans.</i>	(9) 1·3742 ·03742 <u>1·33678</u> <i>Ans.</i> 3·054 ·3054 <u>2·7486</u> <i>Ans.</i>	(10) ·0123 ·009087 <u>·003213</u> <i>Ans.</i> 3·33 2·98765 <u>·34235</u> <i>Ans.</i>

**Ex. 39.** (p. 60.)

- (1)  $3216 \times 225 \div 1000 = 723\cdot6$ . *Ans.*  
 $3321 \times 441 \div 10000 = 146\cdot4561$ . *Ans.*
- (2)  $1 \times 1 \div 10000000 = \cdot0000001$ . *Ans.*  
 $321 \times 231 \div 1000 = 74\cdot151$ . *Ans.*
- (3)  $2345 \times 32 \div 1000000 = \cdot07504$ . *Ans.*  
 $301 \times 2 \div 1000000 = \cdot000602$ . *Ans.*
- (4)  $225 \times 241 \times 24 \div 1000000000 = \cdot0013014$ . *Ans.*  
 $500000 \times 3 \times 1 \div 1000000 = 15 \div 10 = 1\cdot5$ . *Ans.*

- (5)  $27 \times 27 \times 27 \times 270 \div 1000000 = 5.31441$ . *Ans.*  
 $64000 \times 8 \times 4 \times 2 \div 1000000 = 512 \times 8 \div 1000 = 4.096$ . *Ans.*
- (6)  $101 \times 101 \times 11 \times 11 \div 10000000000 = .0001234321$ . *Ans.*  
 $305 \times 7 \times 16 \times 13 \div 1000000000 = .00044408$ . *Ans.*
- 

**Ex. 40.** (p. 62.)

- (1)  $15.625 \div 2.5 = 156.25 \div 25 = 6.25$ . *Ans.*  
 $.015625 \div 25 = .000625$ . *Ans.*
- (2)  $1562.5 \div .00025 = 156250000 \div 25 = 6250000$ . *Ans.*  
 $1.5625 \div 25000 = .0000625$ . *Ans.*
- (3)  $181.3 \div .00037 = 18130000 \div 37 = 490000$ . *Ans.*  
 $171.99 \div 27.3 = 1719.9 \div 273 = 6.3$ . *Ans.*
- (4)  $9.065 \div .049 = 9065 \div 49 = 185$ . *Ans.*  
 $.03 \div .001 = 30 \div 1 = 30$ . *Ans.*
- (5)  $8.000 \div .002 = 8000 \div 2 = 4000$ . *Ans.*  
 $37.5 \div 7.68 = 3750 \div 768 = 4.8828125$ . *Ans.*
- (6)  $15.00 \div 6.25 = 1500 \div 625 = 2.4$ . *Ans.*  
 $17.28 \div 0.144 = 172800 \div 144 = 1200$ . *Ans.*
- (7)  $.00128 \div 8.192 = 1.28 \div 8192 = .00015625$ . *Ans.*  
 $1708.4592 \div 0.0024 = 170845920 \div 24 = 7118580$ . *Ans.*
- (8)  $.0002 \div .0163 = 2.00 \div 163 = .0122699$  &c. *Ans.*  
 $4.00 \div .00255 = 400000 \div 255 = 1568.627$  &c. *Ans.*
- (9)  $11.1 \div 32.76 = 1110.0 \div 3276 = .3388278$  &c. *Ans.*  
 $.0123 \div 3.21 = 1.230 \div 321 = .00383177$  &c. *Ans.*
- (10)  $2.117 \div .0073 = 21170 \div 73 = 290$ . *Ans.*  
 $.032 \div 2.137 = 32.00 \div 2137 = .014974$  &c. *Ans.*
-

## EX. 41. (p. 63.)

- (1)  $\frac{2}{50} = 2 \div 50 = 2 \div 5 = .04$ . *Ans.*  
 $\frac{13}{250} = 13 \div 250 = 1.30 \div 25 = .052$ . *Ans.*  
 $\frac{42}{8} = 42 \div 8 = 5.25$ . *Ans.*       $\frac{1000}{625} = 1000 \div 625 = 1.6$ . *Ans.*
- (2)  $\frac{106}{125} = 106 \div 125 = 848 \div 1000 = .848$ . *Ans.*  
 $11 \frac{17}{1250} = 11 + 136 \div 10000 = 11.0136$ . *Ans.*  
 $\frac{4000}{256} = \frac{250}{16} = 125 \div 8 = 15.625$ . *Ans.*  
 $5 \frac{3}{16} = 5 + 3.0 \div 16 = 5.1875$ . *Ans.*
- (3)  $7 \frac{13}{64} = 7 + 13.0 \div 64 = 7.203125$ . *Ans.*  
 $\frac{17}{128} = 17.0 \div 128 = .1328125$ . *Ans.*  
 $\frac{1}{6400} = .0100 \div 64 = .00015625$ . *Ans.*  
 $11 \frac{53}{31250} = 11 + 5.300 \div 3125 = 11.001696$ . *Ans.*
- (4)  $\frac{1}{512} = 1.000 \div 512 = .001953125$ . *Ans.*  
 $\frac{1025}{1024} = 1025 \div 1024 = 1.0009765625$ . *Ans.*  
 $\frac{13}{1600} = .130 \div 16 = .008125$ . *Ans.*  
 $\frac{7}{5120} = .700 \div 512 = .0013671875$ . *Ans.*
- (5)  $\frac{31}{16}$  of  $\frac{11}{125} = \frac{341}{2000} = .341 \div 2 = .1705$ . *Ans.*  
 $\frac{15}{2}$  of  $\frac{18}{62500} = \frac{27}{12500} = \frac{216}{100000} = .00216$ . *Ans.*  
 $\frac{21}{19}$  of  $\frac{76}{75}$  of  $\frac{2}{7} = \frac{4 \times 2}{25} = \frac{32}{100} = .32$ . *Ans.*

**Ex. 42.** (p. 65.)

$$(1) \quad \frac{13}{9} = 13 \div 9 = 1\cdot4. \quad \text{Ans.} \quad \frac{103}{180} = 5\cdot15 + 9 = \cdot572. \quad \text{Ans.}$$

$$\frac{129}{55} = 25\cdot8 + 112 = 2\cdot345. \quad \text{Ans.}$$

$$\frac{17}{1375} = \frac{68}{5500} = \cdot136 + 11 = \cdot01236. \quad \text{Ans.}$$

$$(2) \quad \frac{41}{14} = 20\cdot5 + 7 = 2\cdot9285714. \quad \text{Ans.}$$

$$\frac{111}{22} = 55\cdot5 + 11 = 5\cdot045. \quad \text{Ans.}$$

$$\frac{22}{1665} = 4\cdot4 + 333 = \cdot0132.$$

$$23 \frac{52}{333} = 23\cdot156. \quad \text{Ans.}$$

$$(3) \quad \frac{89}{9999} = \cdot0089. \quad \text{Ans.} \quad \frac{121}{21} = 5\cdot761904. \quad \text{Ans.}$$

$$17 \frac{6401}{49500} = 17 + 12\cdot802 + 99 = 17\cdot12931. \quad \text{Ans.}$$

$$\frac{4111}{93300} = 41\cdot11 + 333 = \cdot12345. \quad \text{Ans.}$$

$$(4) \quad \frac{135}{3700} = 1\cdot35 \div 37 = \cdot03648. \quad \text{Ans.}$$

$$\frac{297}{2960} = 3\cdot7125 + 37 = \cdot100378. \quad \text{Ans.}$$

$$\frac{378}{925} = \frac{1512}{3700} = 15\cdot12 + 37 = \cdot40864. \quad \text{Ans.}$$

$$\frac{1139}{55555} = 227\cdot8 + 11111 = \cdot020502. \quad \text{Ans.}$$

$$(5) \quad \frac{1}{17} = \cdot05882353 - \frac{1}{17}$$

$$\therefore \text{subtract } 05882353 - \frac{1}{17}$$

$$\begin{array}{r} \cdot0588235294117647 \frac{1}{17} \\ \hline \end{array}$$

$$= \cdot05882352 \ 9411767. \quad \text{Ans.}$$

$$\frac{1}{23} = \cdot04347826087 - \frac{1}{23}$$

$$\therefore \text{subtract } 04347826087 - \frac{1}{23}$$

$$\begin{array}{r} \cdot0434782608695652173913. \\ \hline \end{array} \quad \text{Ans.}$$

$$\frac{1}{29} = \cdot 03448275862069 - \frac{1}{29}$$

$$\therefore \text{subtract} \quad 03448275862069 - \frac{1}{29}$$

$$\underline{\cdot 0344827586206896551724137931} \quad \text{Ans.}$$

$$\frac{1}{31} = \cdot 032 \frac{8}{31},$$

$$= \cdot 032258 \frac{2}{31},$$

$$= \cdot 032258064 \frac{16}{31}, \text{ by adding on } 2\text{cc the } 1\text{st value;}$$

$$\therefore \frac{2}{31} = \cdot 064516129 \frac{1}{31},$$

$$= \cdot 064516129032258, \text{ by adding on the } 2\text{nd value;}$$

$$\therefore \frac{1}{31} = \underline{\cdot 032258064516129.} \quad \text{Ans.}$$

**EX. 43.** (p. 66.)

$$(1) \quad \cdot 3 = \frac{3}{9} = \frac{1}{3} \quad \text{Ans.}$$

$$\cdot 05 = \frac{5}{99} \quad \text{Ans.}$$

$$\cdot 54 = \frac{54}{99} = \frac{6}{11} \quad \text{Ans.}$$

$$\cdot 729 = \frac{729}{999} = \frac{27}{37} \quad \text{Ans.}$$

$$(2) \quad \cdot 024 = \cdot 24 \div 10 = \frac{24}{990} = \frac{4}{165} \quad \text{Ans.}$$

$$\cdot 0432 = \cdot 432 \div 10 = \frac{432}{9990} = \frac{8}{185} \quad \text{Ans.}$$

$$\cdot 00675 = \cdot 675 \div 100 = \frac{675}{99900} = \frac{1}{148} \quad \text{Ans.}$$

$$2 \cdot 0432 = 2 + 4 \frac{32}{99} \div 100 = 2 + \frac{432 - 4}{9900} = 2 \frac{107}{2475} \quad \text{Ans.}$$

$$(3) \quad 3 \cdot 418 = 3 + 4 \frac{18}{99} \div 10 = 3 + \frac{46}{110} = 3 \frac{23}{55} \quad \text{Ans.}$$

$$\cdot 0443 = 44 \cdot 3 \div 1000 = 44 \frac{1}{3} \div 1000 = \frac{133}{3000} \quad \text{Ans.}$$

$$1 \cdot 145 = 1 + 1 \frac{45}{99} \div 10 = 1 + \frac{16}{110} = 1 \frac{8}{55} \quad \text{Ans.}$$

$$\cdot 00449 = 4 \frac{49}{99} \div 1000 = \frac{449 - 4}{99000} = \frac{89}{19800} \quad \text{Ans.}$$

$$(4) \quad 4.0531 = 4 + .531 + 10 = 4 + \frac{531}{9990} = 4 \frac{59}{1110}. \quad \text{Ans.}$$

$$7.6531 = 7 + 6 \frac{531}{999} + 10 = 7 + \frac{725}{1110} = 7 \frac{145}{222}. \quad \text{Ans.}$$

$$2.345 = 2 + 3 \frac{45}{99} + 10 = 2 + \frac{38}{110} = 2 \frac{19}{55}. \quad \text{Ans.}$$

$$.09318 = 93 \frac{18}{99} + 1000 = \frac{1025}{11000} = \frac{41}{440}. \quad \text{Ans.}$$

$$(5) \quad 2.0909 = 2 + .909 + 10 = 2 + \frac{909}{9990} = 2 \frac{101}{1110}. \quad \text{Ans.}$$

$$.54950 = 5 \frac{4950}{9999} + 10 = 5 \frac{50}{101} + 10 = \frac{555}{1010} = \frac{111}{202}. \quad \text{Ans.}$$

$$1.0428571 = 1 + \frac{428571}{999999} + 10 = 1 + \frac{3}{7} + 10 = 1 \frac{3}{70}. \quad \text{Ans.}$$

$$(6) \quad 2.6428571 = 2 + 6 \frac{3}{7} + 10 = 2 + \frac{45}{70} = 2 \frac{9}{14}. \quad \text{Ans.}$$

$$5.19318 = 5 + 193 \frac{18}{99} + 1000 = 5 \frac{2125}{11000} = 5 \frac{17}{88}. \quad \text{Ans.}$$

$$11.287 = 11 + 2 \frac{29}{33} + 10 = 11 + \frac{95}{330} = 11 \frac{19}{66}. \quad \text{Ans.}$$

#### EX. 44. (p. 68.)

\*.\* In Colenso's Treatise the Answers to all the Examples in this Set are given with perfect accuracy, as derived from the conversion of the given decimals to vulgar fractions, that the student may be sure of any degree of accuracy to which he may wish to carry the calculations. In Addition and Subtraction we have calculated only the required approximation.

(2)	.138888889 .142857143 2.418181818 2.066666667 42.636363636 .008497133 <u>47.411455286</u> <i>nearly equal to</i> <u>47.4114553</u> <i>Ans.</i>	(2)	37.233333333 .266666667 7.727272727 .297777778 3.973973974 12.755555556 74.0367 32.411111111 <u>168.702391146</u> <i>Ans.</i>
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(3)	$\begin{array}{r} .33333333 \\ .09090909 \\ \hline .24242424 \end{array}$	(4)	$\begin{array}{r} 7.0 \\ 6.142857143 \\ \hline .857142857 \end{array}$	
	<i>Ans.</i>		<i>Ans.</i>	
	$\begin{array}{r} .04040404 \\ .00769239 \\ \hline .03271165 \end{array}$	<i>Ans.</i>	$\begin{array}{r} .04222222 \\ .03636363 \\ \hline .005858586 \end{array}$	<i>Ans.</i>

$$(5) \quad 37.2\bar{3} \times .2\bar{6} = \frac{372\frac{1}{3}}{10} \times \frac{2\frac{2}{3}}{10} = \frac{1117 \times 8}{900} = 9.92\bar{8}. \quad \text{Ans.}$$

$$7.7\bar{2} \times .29\bar{7} = 7\frac{8}{11} \times \frac{11}{37} = \frac{85}{37} = 2.29\bar{7}. \quad \text{Ans.}$$

$$(6) \quad 3.97\bar{3} \times 8 = 3\frac{973}{999} \times 8 = 31\frac{791}{999} = 31.791. \quad \text{Ans.}$$

$$74.0367 \times 4.7\bar{5} = 74.0367 \times 47\frac{5}{9},$$

$$= 82263 \times 428 = 352.08564. \quad \text{Ans.}$$

$$(7) \quad .3 + .\bar{0}9 = \frac{1}{3} + \frac{1}{11} = 3\frac{2}{3} = 3.6. \quad \text{Ans.}$$

$$.04 + .769230 = \frac{4}{99} + \frac{769230}{999999} = \frac{4 \times 10101}{769230} = .052. \quad \text{Ans.}$$

$$(8) \quad 7 \div .142857 = 7 \times \frac{999999}{142857} = 7 \times 7 = 49. \quad \text{Ans.}$$

$$.042 + .036 = 42 + 36\frac{2}{3} = 126 + 110 = 1.14\bar{5}. \quad \text{Ans.}$$

**Ex. 45.** (p. 69)

(1)	$\begin{array}{r} £.45 \\ 20 \\ \hline 9.00s. \\ 9s. \\ \hline \end{array}$	$\begin{array}{r} £.68125 \\ 20 \\ \hline 13.62500s. \\ 12 \\ \hline 7.500d. \\ 13s. 7\frac{1}{2}d. \end{array}$	$\begin{array}{r} £2.325 \\ 20 \\ \hline 6.500s. \\ 12 \\ \hline 6.0d. \\ £2 \ 6s \ 6d. \end{array}$
	<i>Ans.</i>	<i>Ans.</i>	<i>Ans.</i>
(2)	$\begin{array}{r} 32.5 \text{ of } 5s. \\ 5 \\ \hline 162.5s. \\ 12 \\ \hline 6.0d. \\ £8 \ 2s. \ 6d. \end{array}$	$\begin{array}{r} 1.85 \text{ of } 40d. \\ 40 \\ \hline 74.00d. \\ 6s. \ 2d. \end{array}$	$\begin{array}{r} 2.375 \text{ of } 160d. \\ 160 \\ \hline 380.000d. \\ = 31s. \ 8d. \\ \text{or } £1 \ 11s. \ 8d. \end{array}$
	<i>Ans.</i>	<i>Ans.</i>	<i>Ans.</i>

<p>(3)</p> $  \begin{array}{r}  .13125 \\  \underline{5} \\  \pounds.65625 \\  \underline{20} \\  13.12500s. \\  \underline{12} \\  1.500d. \\  \underline{13s. 1\frac{1}{2}d.} \quad Ans.  \end{array}  $	$  \begin{array}{r}  .001953125 \\  \underline{40} \\  \pounds.078125000 \\  \underline{20} \\  1.562500s. \\  \underline{12} \\  6.7500d. \\  \underline{1s. 6\frac{3}{4}d.} \quad Ans.  \end{array}  $
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<p>(4)</p> $  \begin{array}{r}  3.45 \times \pounds 5\frac{1}{4} \\  \underline{5\frac{1}{4}} \\  17.25 \\  .8625 \\  \pounds 18.1125 = \pounds 18 \ 2s. \ 3d. \quad Ans.  \end{array}  $	$  \begin{array}{r}  .325 \times 30 \text{ cwt.} \\  \underline{30} \\  9.750 \text{ cwt.} \\  = 9 \text{ cwt. } 3 \text{ qrs.} \quad Ans.  \end{array}  $
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(5)  $23.42 \text{ da.} = 23 \text{ da. } 10 \text{ hrs. } 4 \text{ min. } 48 \text{ sec.} \quad Ans.$   
 $1.46875 \text{ ac.} = 1 \text{ ac. } 1 \text{ ro. } 35 \text{ po.} \quad Ans.$

<p>(6)</p> $  \begin{array}{r}  2.74 \text{ of } \pounds \frac{5}{8} \\  \underline{5} \\  8 \overline{)13.70} \\  \pounds 1.7125 \\  = \pounds 1 \ 14s. \ 3d. \quad Ans  \end{array}  $	$  \begin{array}{r}  22.25 \text{ of } \pounds 2\frac{1}{8} \\  \underline{2\frac{1}{8}} \\  44.50 \\  \underline{2.78125} \\  \pounds 47.28125 = \pounds 47 \ 5s. \ 7\frac{1}{2}d. \quad Ans.  \end{array}  $
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<p>(7)</p> $  \begin{array}{r}  3.225 \text{ of } 2\frac{1}{2} \text{ guin.} \\  \underline{2\frac{1}{2}} \\  6.450 \\  1.6125 \\  20 \overline{)8.0625} \text{ guin.} \\  .403125 \\  \pounds 8.465625 = \pounds 8 \ 9s. \ 3\frac{3}{4}d. \quad Ans.  \end{array}  $	$  \begin{array}{r}  22.75 \text{ of } 110\frac{1}{2}s. \\  \underline{110\frac{1}{2}} \\  2502.50 \\  \underline{11.375} \\  2513.875s. \\  = \pounds 125 \ 13s. \ 10\frac{1}{2}d. \quad Ans.  \end{array}  $
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<p>(8)</p> $  \begin{array}{r}  3.03 \text{ of } 125d. \\  \underline{1000} \\  8 \overline{)3030.00} \\  378.75d. \\  = 31s. \ 6\frac{3}{4}d. \quad Ans.  \end{array}  $	$  \begin{array}{r}  3 \overline{)0474609375} \text{ of } \pounds 10\frac{2}{3} \\  \underline{11} \\  .5220703125 \\  .0158203125 \\  \pounds .50625 = 10s. \ 1\frac{1}{2}d. \quad Ans.  \end{array}  $
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(9)  $.176 \text{ of } 1 \text{ fur. } 36 \text{ po. } 2 \text{ yds. } 5 \text{ in.} = 15125 \text{ in.} \times .176 = 15\frac{1}{8} \text{ in.} \times 176$   
 $= 121 \text{ in.} \times 22; \text{ and as } 1 \text{ pole is } = 198 \text{ in. } \therefore 121 \times 22 + 198$   
 $= 121 + 9 \text{ po.} = 13 \text{ po. } 2 \text{ yds. } 1 \text{ ft. } 4 \text{ in.} \quad Ans.$   
 $.22 \text{ of } 3 \text{ qrs. } 15 \text{ lbs.} = 99 \text{ lbs.} \times .22 = 22 - .22 = 21.78 \text{ lbs.}$   
 $= 21 \text{ lbs. } 12 \text{ oz. } 7.68 \text{ drs.} \quad Ans.$

$$(10) \quad 2775 \text{ of } 1 \text{ sq. yd. } 3\frac{1}{2} \text{ ft.} = 12\frac{1}{2} \text{ sq. ft.} \times 2775 = 100 \text{ sq. ft.} \times .0346875 \\ - 3.46875 \text{ sq. ft.} = 3 \text{ sq. ft. } 67\frac{1}{2} \text{ in.} \quad \text{Ans.}$$

$$32.156 \text{ of } 3 \text{ mi. } 330 \text{ yds.} = 3\frac{3}{16} \text{ mi.} \times 32.156 = 102.49725 \text{ mi.} \\ = 102 \text{ mi. } 875 \text{ yds. } 5.76 \text{ in.} \quad \text{Ans.}$$

$$(11) \quad 2.441 \text{ of } £32 \text{ Os. } 4\frac{1}{2}d. = 640\frac{3}{8}s. \times 2.441 = 5123s. \times .305125 \\ = 1563.155375s. = £78 \text{ 3s. } 1.8645d. \quad \text{Ans.}$$

$$33.25 \text{ of } £3 \text{ 12s. } 4\frac{1}{2}d. = £3 \text{ 12s. } 4\frac{1}{2}d. \times 33\frac{1}{4} = £120 \text{ 5s. } 9\frac{5}{16}d. \quad \text{Ans.}$$

$$(12) \quad 44.045d. \times 11\frac{1}{2} = 495.50625d. = 41s. \text{ 3s. } 50625d. \quad \text{Ans.}$$

$$.5s. + .7 \times 5s. + .125 \times 20s. = .5 + 3.5 + 2.5 = 6.5s. = 6s. \text{ 6d.} \quad \text{Ans.}$$

$$(13) \quad .634375 \text{ of } 20s. + .025 \text{ of } 25s. + .325 \text{ of } 30s. = 12.6875 + .625 + 9.75 \\ = 23.0625s. = 23s. \text{ 0}\frac{3}{4}d. \quad \text{Ans.}$$

$$(14) \quad (.871875 + 1.146875) \times 80d. - .0625 \times 252d. = 161.5 - 15.75 = \\ 145.75d. = 12s. \text{ 1}\frac{3}{4}d. \quad \text{Ans.}$$

$$(15) \quad .375 \times 252d. + .1875 \times 60d. + .3 \times 90d. - .875 \times 2d. = 94.5 + 11.25 \\ + 27 - 1.75 = 131d. = 10s. \text{ 11d.} \quad \text{Ans.}$$

$$(16) \quad 3.83 \text{ of } 4s. = \frac{1}{10} \text{ of } 38\frac{1}{3} \text{ of } 4s. = \frac{4s. \times 115}{30} = 15s. \text{ 4d.} \quad \text{Ans.}$$

$$6.15 \text{ of } 33\frac{3}{4}d. = \frac{1}{10} \text{ of } 61\frac{5}{9} \text{ of } 33\frac{3}{4}d. = 277d. \times \frac{3}{4} = 207\frac{3}{4}d. = \\ 17s. \text{ 4}\frac{3}{4}d. \quad \text{Ans.}$$

$$(17) \quad 23.45 \text{ of } 3\frac{5}{8} \text{ mi.} = 23\frac{5}{11} \text{ of } 3\frac{5}{8} \text{ mi.} = \frac{3741}{44} \text{ mi.} = 85 \text{ mi. } 7 \text{ po. } 1\frac{1}{2} \text{ yd.} \\ \text{Ans.}$$

$$13.275 \text{ of } 5\frac{1}{2} \text{ ac.} = \frac{1}{10} \text{ of } 132\frac{25}{33} \text{ of } 5\frac{1}{2} \text{ ac.} = \frac{4381}{60} \text{ ac.} \\ = 73 \text{ ac. } 2 \text{ po. } 20\frac{1}{8} \text{ yds.} \quad \text{Ans.}$$

$$(18) \quad 2.207 \text{ of } 832\frac{1}{2}d. = \frac{1}{100} \text{ of } 220\frac{7}{9} \text{ of } 832\frac{1}{2}d. = 1987d. \times 37 \div 40 \\ = £7 \text{ 13s. } 1\frac{39}{40}d. \quad \text{Ans.}$$

$$2.145 \text{ of } 68\frac{3}{4}d. = \frac{1}{10} \text{ of } 21\frac{5}{11} \text{ of } 68\frac{3}{4}d. = 59d. \times \frac{5}{2} = 12s. \text{ 3}\frac{1}{2}d. \\ \text{Ans.}$$

$$(19) \quad \begin{array}{r} £39791\frac{3}{4} \\ 20 \\ \hline 7.95833\frac{3}{4}s. = 7s. \text{ 11}\frac{1}{2}d. \quad \text{Ans.} \end{array} \quad \begin{array}{r} .4097\frac{2}{3} \text{ guin.} \\ 21 \\ \hline 8.6041\frac{2}{3}s. = 8s. \text{ 7}\frac{1}{4}d. \quad \text{Ans.} \\ 12 \\ \hline 7.2500d. \end{array}$$

$$\underline{\underline{11.50000d.}}$$

- (20)  $\frac{571428}{999999} \text{ qr.} = \frac{4}{7} \text{ of } 28 \text{ lbs.} = 16 \text{ lbs. } \textit{Ans.}$   
 $\frac{285714}{999999} \text{ cwt.} = \frac{2}{7} \text{ of } 112 \text{ lbs.} = 32 \text{ lbs. } \textit{Ans.}$

**EX. 46.** (p. 70.)

- (1)  $9s. 6d. = 9 \cdot 5s. = £475. \textit{Ans.}$   
 $2\frac{1}{2}d. = 2 \cdot 25d. = 1875s.; \text{ and } 2 \cdot 1875s. \div 100s. = 021875. \textit{Ans.}$
- (2)  $5s. + 13s. 4d. = 6d. \div 16d. = 3 \div 8 = \cdot 375. \textit{Ans.}$   
 $17s. 3d. + 10s. = 17 \cdot 25s. \div 10s. = 1 \cdot 725. \textit{Ans.}$
- (3)  $£1 2s. 6d. = £1\frac{1}{8} = £1 \cdot 125. \textit{Ans.}$   
 $7\frac{1}{2}d. = 7 \cdot 5d. = 625s.; \text{ and } 2 \cdot 625s. + 10s. = 2625. \textit{Ans.}$
- (4)  $3s. 3\frac{3}{4}d. \div 26s. 6d. = 13s. 3d. + (53s. \times 2) = 53s. + (53s. \times 8) = \frac{1}{8} = \cdot 125. \textit{Ans.}$   
 $64s. 2d. + 2s. 4d. = 385s. + 14s. = 55 + 2 = 27 \cdot 5. \textit{Ans.}$
- (5)  $78\frac{3}{4}d. + 252d. = 315 \div (252 \times 4) = 5 + 16 = \cdot 3125. \textit{Ans.}$   
 $7\frac{1}{8}s. + 40s. = 7 \cdot 875 + 40 = 7875 \div 4 = 196875. \textit{Ans.}$
- (6)  $9\frac{1}{8} \text{ oz.} \div 16 \text{ oz.} = 9 \cdot 125 \div 16 = 5703125. \textit{Ans.}$   
 $33 \text{ yds.} \div 5\frac{1}{2} = 6 \text{ po.} = \frac{3}{20} \text{ fur.} = \cdot 15 \text{ fur.}$   
 $3 \cdot 15 \text{ fur.} \div 8 \text{ fur.} = 39375. \textit{Ans.}$
- (7)  $2\frac{1100}{1760} \text{ mi.} = 2\frac{5}{8} = 2 \cdot 625 \text{ mi.}$   
 $\therefore 2 \cdot 625 \text{ mi.} \div 3 \text{ mi.} = \cdot 875. \textit{Ans.}$   
 $21'' = 35'; 55 \cdot 35' = 9225 \text{ hr.}$   
 $\therefore 12 \cdot 9225 \text{ hrs.} \div 24 \text{ hrs.} = 1 \cdot 076875 + 2 = 5384375. \textit{Ans.}$
- (8)  $7 \text{ drs.} + 16 = 4375 \text{ oz.}$   $18\frac{1}{2} \text{ da.} + 365 \text{ da.} =$   
 $16)1 \cdot 4375 \text{ oz.}$   $73 \div (365 \times 4) =$   
 $28)3 \cdot 08984375 \text{ lbs.}$   $1 + 20 = 05. \textit{Ans.}$   
 $4)3 \cdot 1103515625 \text{ qrs.}$   
 $\underline{777587890625} \text{ cwt. } \textit{Ans.}$
- (9)  $6\frac{3}{4}d. = 6 \cdot 75d. = 5625s.$   
 $\therefore 15 \cdot 5625s. + 80s. = 19453125. \textit{Ans.}$   
 $3\frac{1}{4} \text{ qrs.} = 3 \cdot 25 \text{ qrs.} = 8125 \text{ cwt.}$   
 $\therefore 1 \cdot 8125 \text{ cwt.} + 50 \text{ cwt.} = 03625. \textit{Ans.}$

- (10)  $20) 3.75 \text{ guin.}$   $4.5 \text{ lbs.} + 96 \text{ lbs.} =$   
 $\quad \quad \quad 1875$   $\quad \quad \quad 375 + 8 =$   
 $\quad \quad \quad \underline{\pounds 3.9375} + \pounds 100$   $\quad \quad \quad 046875. \text{ Ans.}$   
 $\quad \quad \quad = \underline{\pounds 039375. \text{ Ans.}}$
- (11)  $13s. 4d. + 5s. = 160d. + 60d. = 2.6. \text{ Ans.}$   
 $44\frac{1}{2} \text{ cwt.} \div 31\frac{1}{4} \text{ cwt.} = 178 + 125 = 1424 \div 1000 = 1.424. \text{ Ans.}$
- (12)  $3\frac{1}{2} \text{ in.} = \frac{7}{24} \text{ ft.}; \text{ and } \frac{1}{4} \text{ mi.} = 5280 \text{ ft.} \div 4 = 1320 \text{ ft.};$   
 $\frac{7}{24} \div 1320 = 7 \div (80 \times 4 \times 99) = .00022095. \text{ Ans.}$   
 $20) 22 \text{ guin.}$   
 $\quad \quad \quad 1.1$   
 $\quad \quad \quad \underline{\pounds 23.1 \div \pounds 25} = 92.4 \div 100 = .924. \text{ Ans.}$
- (13)  $2.1 \text{ ro.} + 1\frac{1}{8} \text{ ro.} = 16.8 + 9 = 1.88. \text{ Ans.}$   
 $6\frac{3}{4}d. = 6.75d. = .5625s.;$   
 $\therefore 51.5625s. + 60s. = .859375. \text{ Ans.}$
- (14)  $1172 \text{ sq. in.} \div 12 \text{ sq. in.} = 97.6. \text{ Ans.}$   
 $6\frac{1}{2}d. = 6.5d. = .5416s.$   
 $\therefore 7.541666 \text{ \&c.} \div 20 = .377083. \text{ Ans.}$
- (15)  $20\frac{1}{4} \text{ da.} + 4\frac{1}{2} \text{ da.} = 162 + 33 = 54 \div 11 = 4.90. \text{ Ans.}$   
 $1590.75d. + 378d. = 176.75 + 42 = 25.25 \div 6 = 4.2083. \text{ Ans.}$
- (16)  $2.25'' = .0375'; 3.0375' = .050625 \text{ hrs.}$   
 $\therefore 3.050625 \text{ hrs.} + 24 \text{ hrs.} = .127109375. \text{ Ans.}$   
 $6.25d. = .52083s.; \text{ and } 12.52083s. = \pounds.6260416.$   
 $\therefore \pounds 24.6260416 \div \pounds 4 = 6.156510416. \text{ Ans.}$

## MISCELLANEOUS EXAMPLES.

Ex. 47. (p. 71.)

- (1)  $\frac{14.4 + 1.44}{14.4 - 1.44} = \frac{15.84}{12.96} = \frac{132}{108} = 1\frac{2}{9}. \text{ Ans.}$
- (2)  $.03 = \frac{1}{10} \text{ of } \frac{3}{9} = \frac{1}{30} \text{ of hf. a cr.} = 1d.$   
 $\therefore 1d. \times .5 = \frac{1}{2}d. \text{ Ans.}$

- (3)  $24857 \text{ mi.} + (3 \cdot 1416 \times 2) = 24857 \cdot 0000 \div 62832$   
 $= 3956 \text{ mi. nearly. Ans.}$
- (4)  $\begin{array}{r} 365 \cdot 25 \\ 365 \cdot 242264 \\ \hline \end{array}$   
 error =  $\frac{007736}{400}$  of a day per annum;  
*Ans.*  $\frac{3 \cdot 094400}{\text{days in 4 centuries.}}$
- (5)  $7 \cdot 00 \div 256 = \cdot 02734375. \text{ Ans.}$   $256 \div 7 = 36 \cdot 571428. \text{ Ans.}$   
 $3 \cdot 75 = 3 \frac{75}{100} = 3 \frac{3}{4}. \text{ Ans.}$   $3 \cdot 75 = \frac{1}{10} \text{ of } 37 \frac{5}{9} = 3 \frac{34}{45}. \text{ Ans.}$   
 $\cdot 235 \times \cdot 0021 = 235 \times 21 + 10000000 = \cdot 0004935. \text{ Ans.}$   
 $\cdot 235 \times 1 \cdot 2 = 235 \times 12 + 10000 = \cdot 282. \text{ Ans.}$
- (6)  $7 \cdot 5s. = £ \cdot 375. \text{ Ans.}$   $£2 \cdot 6625 = £2 \ 13 \cdot 25s. = £2 \ 13s. \ 3d. \text{ Ans.}$   
 $1 \text{ oz.} = \cdot 0625 \text{ lbs.}; \text{ hence } £ \cdot 03125 = \cdot 625s. = 7 \frac{1}{2}d. \text{ Ans.}$
- (7)  $£ \cdot 6 + \cdot 3125s. + \frac{2}{9} \text{ of } 21s. = 12s. + 3 \frac{1}{2}d. + 4s. \ 8d. = 16s. \ 11 \frac{1}{2}d. \text{ Ans.}$
- (8)  $3 \div 22 = \cdot 136. \text{ Ans.}$   $4 \frac{3}{14} = 4 \cdot 2142857. \text{ Ans.}$   
 $\cdot 0123 = \frac{1}{100} \text{ of } 1 \frac{23}{99} = \frac{122}{9900} = \frac{61}{4950}. \text{ Ans.}$   
 $18 \cdot 073 + \cdot 0341 = 180730 \div 341 = 530. \text{ Ans.}$   
 $18 \cdot 073 \div 5300 = 18073 \div 53 = \cdot 00341. \text{ Ans.}$
- (9)  $\begin{array}{r} £ \cdot 453125 = 9s. \ 0 \cdot 75d. \\ 1 \cdot 1484375s. = 1 \ 1 \cdot 78125 \\ \quad \quad \quad 0 \ 0 \cdot 71875 \\ \hline 10s. \ 3 \cdot 25d. = 10s. \ 3 \frac{1}{4}d. \text{ Ans.} \end{array}$
- (10)  $£ \cdot 375 \times \frac{20}{21} = 3571428 \text{ guin. Ans.}$   
 $1 \cdot 25 \text{ of } 73 \cdot 5s. \div 10 \cdot 5s. = 1 \cdot 25 \text{ of } 7 = 8 \cdot 75. \text{ Ans.}$
- (11)  $30069 \frac{4}{9} \text{ da.} = 7 \cdot 21666 \frac{2}{3} \text{ hrs.} = 7 \text{ hrs. } 13 \text{ min. Ans.}$   
 $\cdot 917897 \frac{8}{11} \times 2 = 1 \cdot 835795 \frac{5}{11} \text{ ac.} = \frac{1}{11} \text{ of } 20 \cdot 19375 \text{ ac.}$   
 $= \frac{1}{11} \text{ of } 20 \text{ ac. } 0 \text{ ro. } 31 \text{ po.} = 1 \text{ ac. } 3 \text{ ro. } 13 \text{ po. } 22 \text{ yds. Ans.}$

$$\begin{aligned}
 (12) \quad 3\frac{2}{5} &= 3\frac{16}{40} && = 3.4 \\
 4\frac{1}{8} &= 4\frac{5}{40} && = 4.125 \\
 &1\frac{11}{40} && = 1.275 \\
 \hline
 8\frac{4}{5} &= 8\frac{500}{625} = 8.8 \\
 &3\frac{13}{625} = 3.0208 \\
 \hline
 11\frac{513}{625} &= 11.8208. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (13) \quad (21s. + 5s. + 72.5s.) \times 1.875 &= 98.5s. \times 1.875 \\
 &= £4 \ 18s. \ 6d. \times 1\frac{7}{8} = £9 \ 4s. \ 8\frac{1}{4}d. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (14) \quad £3.125 &= 62.50s. \\
 10.5s. \times 5\frac{1}{2} &= 57.75s. \\
 \hline
 4.75s. + 2.5s. &= 1.9. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (15) \quad 5782\frac{1}{2}d. \times 19\frac{1}{4} &= 11565 \times 77 + 8 = 111313\frac{1}{8}d. \\
 &= £463 \ 16s. \ 1\frac{1}{8}d.. \quad \text{Ans.} \\
 £168 \ 5s. \ 4\frac{2}{5}d. + 1\frac{8}{25} &= £4206 \ 13s. \ 6d. + 33 = £127 \ 9s. \ 6d. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (16) \quad .0015625 \text{ ton} &= .08125 \text{ cwt.} = 3.5 \text{ lbs.} = 56 \text{ oz.}; \\
 \text{also } .458\frac{1}{8}s. &= 5.5d.; \text{ hence } 5.5d. \times 56 = 25s. \ 8d. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (17) \quad \text{Diff. of } 1.6 \text{ of } 3.4 \text{ of } £1\frac{1}{8} \text{ and } \frac{1}{5} \text{ of } 3\frac{2}{3} \text{ of } £9.1125 \\
 = \text{Diff. of } £9 \times 3.4 \times .2 \text{ and } £.6075 \times 11 = £6.6825 - £6.12 \\
 = £.5625 = 11s. \ 3d. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (18) \quad 17 + 256 &= .06640625. \quad \text{Ans.} && 1 \div 101 = .0099. \quad \text{Ans.} \\
 .0675 &= \frac{675}{10000} = \frac{27}{400}. \quad \text{Ans.} \\
 .067\frac{5}{9} &= \frac{1}{1000} \text{ of } 67\frac{5}{9} = \frac{608}{9000} = \frac{76}{1125}. \quad \text{Ans.} \\
 100s. \times .73125 &= 73.125s. = £3 \ 13s. \ 1\frac{1}{2}d. \quad \text{Ans.}
 \end{aligned}$$

$$\begin{aligned}
 (19) \quad .0625 \text{ cwt.} \times 112 &= 7 \text{ lbs.}; \text{ hence } 16s. \times .0703\frac{1}{8} \times 7 = 7\frac{7}{8}s. \\
 &= 7s. \ 10\frac{1}{2}d. \quad \text{Ans.}
 \end{aligned}$$

$$(20) \quad \frac{3}{5} + \frac{9}{10} = \frac{3}{2}; \text{ and } 7\left(\frac{1}{8} + \frac{1}{32}\right) = \frac{35}{32}; \text{ hence } \frac{3}{2} + \frac{35}{32} = 2\frac{19}{32}$$

$$\text{Again; } \frac{3}{5} + \frac{9}{10} = \cdot 6 + \cdot 9 = 1\cdot 5$$

$$\frac{7}{8} = \cdot 875$$

$$\frac{1}{4} \text{ of } \frac{7}{8} = \cdot 21875$$

$$\frac{2\frac{19}{32}}{32} = 2\cdot 59375. \quad \text{Ans.}$$

$$(21) \quad 3\cdot 5s. \times 12 = 42\cdot 00d.$$

$$23\cdot 375s. \times 12 \times 2\cdot 9 = 813\cdot 45d.$$

$$\frac{855\cdot 45d.}{100\cdot 00d.}$$

$$\frac{1}{2} \text{ of } 16\frac{2}{3}s. \times 12 = 100\cdot 00d.$$

$$\frac{755\cdot 45d.}{100\cdot 00d.} = 62s. 11\frac{9}{20}d. \quad \text{Ans.}$$

$$(22) \quad 17\frac{428571}{999999} = 17\frac{3}{7} \text{ sq. ft.} = 17 \text{ sq. ft. } 61\frac{5}{7} \text{ in.}$$

$$0 \quad 100\frac{8}{9}$$

$$16 \text{ sq. ft. } 104\frac{52}{63} \text{ in.} \quad \text{Ans.}$$

$$1\cdot 76 \text{ c. yds.} = 47\cdot 52 \text{ c. ft.}; \text{ and } 47\cdot 52 - 26\cdot 66$$

$$= 20\cdot 86 \text{ c. ft.} = 20 \text{ c. ft. } 1486\cdot 08 \text{ in.} \quad \text{Ans.}$$

$$(23) \quad \cdot 0235 \times 8\cdot 08 = \cdot 18988. \quad \text{Ans.}$$

$$\cdot 0625 + 2\cdot 5 = \cdot 625 \div 25 = \cdot 025. \quad \text{Ans.}$$

$$\cdot 843541\frac{2}{3} \text{ of } £5 = £4\cdot 217708\frac{1}{3} = £4 \text{ 4s. } 4\frac{1}{2}d. \quad \text{Ans.}$$

$$(24) \quad 85\cdot 3125d. \times 72\frac{3}{4} = 682\frac{1}{2}d. \times 9\frac{3}{32} = \frac{1365 \times 291}{64}$$

$$= 6206\frac{31}{64}d. = £25 \text{ 17s. } 2\frac{31}{64}d. \quad \text{Ans.}$$

$$211s. 3d. \div 29\frac{1}{4} = 845s. + 117 = 65s. + 9 = 7s. 2\frac{3}{4}d. \quad \text{Ans.}$$

$$(25) \quad 4\frac{4}{9} \text{ guin.} = \frac{1}{9} \text{ of } £42 \quad \dots = £4 \text{ 13s. } 4d.$$

$$£41\frac{2}{3} = 8\cdot 33\frac{1}{3} \quad \dots = 0 \text{ 8 4}$$

$$3\cdot 75 \text{ of } 30d. = 112\frac{1}{2}d. \quad \dots = £0 \text{ 9 4}\frac{1}{2}$$

$$3\frac{4}{7} \text{ guin.} = \frac{1}{10} \text{ of } £\frac{21}{20} \times 3\frac{4}{7} = 0 \text{ 7 6}$$

$$\begin{array}{r} £0 \text{ 16s } 10\frac{1}{2}d. \\ £4 \text{ 4s. } 9\frac{1}{2}d. \\ \hline \text{Ans.} \end{array}$$



$$(26) \quad 27\frac{1}{3} \text{ ft.} \times \frac{1}{10} \text{ of } 201\frac{2}{3} \text{ ft.} + 2\frac{4}{9} \text{ ft.} = 82 \times 60 \cdot 5 + 22$$

$$= 41 \times 5 \cdot 5 = 225\frac{1}{2} \text{ ft.} = 75\frac{1}{6} \text{ yds.} \quad \text{Ans.}$$

$$(27) \quad \cdot 375 \text{ of } £5 \cdot 375 = £671875 \times 3 = £2 \cdot 015625 = 40s. \quad 3\frac{3}{4}d. \quad \text{Ans.}$$

$$£100 \times \cdot 06328125 = £6 \cdot 328125 = £6 \text{ } 6s. \quad 6\frac{3}{4}d. \quad \text{Ans.}$$

$$9 \cdot 75d. = 8125s.; \text{ hence } 47 \cdot 8125s. + 10s. = 4 \cdot 78125. \quad \text{Ans.}$$

$$(28) \quad 3\frac{1}{2} + \frac{1}{10} \text{ of } 28\frac{1}{3} + \frac{2}{3} + 1\frac{7}{40} = 8\frac{7}{40} = 8 \cdot 175. \quad \text{Ans.}$$

$$\frac{1}{10} \text{ of } 117\frac{1}{3} - \frac{1}{100} \text{ of } 1091\frac{2}{3} = \frac{49}{60} = 81\frac{1}{6}. \quad \text{Ans.}$$

$$3\frac{3}{8} \times 1\frac{2}{3} \times 4\frac{4}{5} = 27. \quad \text{Ans.}$$

$$3\frac{3}{8} \div 4\frac{1}{2} = \frac{3}{4} = \cdot 75. \quad \text{Ans.}$$

$$\frac{327}{40} \times \frac{49}{60} \times \frac{27}{1} \times \frac{3}{4} = 4326 \cdot 21 + 32 = 135 \cdot 1940625. \quad \text{Ans.}$$

$$(29) \quad \frac{4}{8}d. \times 3\frac{1}{2} \times 1\frac{1}{5} = 147d. \div 8 = 18\frac{3}{8}d. = 1s. \quad 6\frac{3}{8}d.$$

$$\frac{4}{2}d. \times \frac{3}{7} \times \frac{1}{10} \text{ of } 9\frac{6}{11} \times \frac{1}{10} \text{ of } 18\frac{1}{3} = 0 \quad 3\frac{3}{8}$$


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$$1s. \quad 9\frac{3}{8}d. \quad \text{Ans.}$$

$$(30) \quad £93 \times 22 \cdot 791\frac{2}{3} = £68 \cdot 375 \times 31 = £21 \cdot 19625 =$$

$$£21 \text{ } 3s. \quad 11\frac{1}{10}d. \quad \text{Ans.}$$

$$(31) \quad \frac{7}{64} = \cdot 109375. \quad \text{Ans.} \quad \frac{7}{65} = 1 \cdot 4 \div 13 = \cdot 1076923. \quad \text{Ans.}$$

$$\cdot 65 = \frac{65}{100} = \frac{13}{20}. \quad \text{Ans.}$$

$$\cdot 06\frac{51}{99} = \frac{1}{100} \text{ of } 6\frac{17}{33} = \frac{43}{660}. \quad \text{Ans.}$$

$$3 \cdot 75d. = 3125s.; \quad 3 \cdot 3125s. = £165625;$$

$$\text{hence } £2 \cdot 165625 + £4 = 54140625. \quad \text{Ans.}$$

$$(32) \quad \frac{2}{7} \text{ of } £30 = £8 \text{ } 11s. \quad 5\frac{1}{7}d.$$

$$6\frac{6}{7} \text{ of } £1 = 6 \text{ } 17 \quad 1\frac{5}{7}$$

$$\frac{2}{3} \text{ of } \frac{5}{7} \text{ of } £\frac{3}{5} = £\frac{2}{7} = 0 \text{ } 5 \quad 8\frac{4}{7}$$

$$1\frac{1}{3} \text{ of } \frac{3}{7} \text{ of } 1s. = \frac{4}{7}s. = 0 \text{ } 0 \quad 6\frac{6}{7}$$

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$$£15 \text{ } 14s. \quad 10\frac{2}{7}d. \quad \text{Ans.}$$

$$(33) \quad 2\frac{5}{8} = 2.625. \text{ Ans.} \quad \frac{4}{111} = \frac{36}{999} = .036. \text{ Ans.}$$

$$2.05 = 2\frac{5}{100} = 2\frac{1}{20}. \text{ Ans.} \quad \frac{1}{100} \text{ of } 20\frac{5}{9} = \frac{37}{180}. \text{ Ans.}$$

$$2.25d. = .1875s.; \quad 17.1875s. = £.859375;$$

$$\text{hence } £19.859375 + £5 = £3.971875. \text{ Ans.}$$

$$(34) \quad 1 \text{ cwt. } 2 \text{ qrs. } 3 \text{ lbs.} \times 5\frac{1}{8} = 7 \text{ cwt. } 3 \text{ qrs. } 8\frac{3}{8} \text{ lbs.} \text{ Ans.}$$

$$£3834 \text{ Os. } 5\frac{1}{4}d. + 441\frac{3}{4} = £15336 \text{ ls. } 9d. + 1767$$

$$= £8 \text{ } 13s. \text{ } 7d. \text{ Ans.}$$

$$(35) \quad 1.68\frac{1}{3} \text{ lbs.} = \frac{1}{100} \text{ of } 168\frac{1}{3} \text{ lbs.};$$

$$\text{hence } £4\frac{1}{101} \times 12 \times \frac{1}{100} \text{ of } 168\frac{1}{3} \text{ lbs.}$$

$$= \frac{405 \times 12 \times 505}{101 \times 100 \times 3} = £81. \text{ Ans.}$$

$$(36) \quad £\frac{6}{10} + \frac{2}{3} \text{ of } 63d. + 5s. \times 3\frac{3}{4} = 12s. + 3.5s. + 18.75s.$$

$$\text{hence } 34.25s. \div 16s. = 2.140625. \text{ Ans.}$$

$$(37) \quad \frac{1}{4} + \frac{16}{25} + \frac{43}{50} + 3\frac{1}{2} = .25 + .64 + .86 + 3.5 = 5.25;$$

$$\text{hence } 5.25 \div 175 = .03. \text{ Ans.}$$

$$(38) \quad .285 \times 4.02 = 1.1457. \text{ Ans.}$$

$$2.961 \div .007 = 2961 \div 7 = 423. \text{ Ans.}$$

$$80d. \times 2.778\frac{1}{8} = 222.25d. = 18s. \text{ } 6\frac{1}{4}d. \text{ Ans.}$$

$$(39) \quad \frac{2\frac{3}{8}}{\frac{1}{10} \text{ of } 31\frac{3}{8}} \times \frac{4\frac{4}{9}}{\frac{1}{18}} \times \frac{7}{8\frac{8}{9}} \times \frac{5\frac{5}{8}}{\frac{1}{4}}$$

$$= \frac{19 \times 30}{95 \times 8} \times \frac{40 \times 16}{9} \times \frac{63}{80} \times \frac{45}{32} = \frac{3}{4} \times 56 \times \frac{45}{32}$$

$$= \frac{42 \times 45}{32} = \frac{945}{16} = 59.0625. \text{ Ans.}$$

$$(40) \quad £2 \text{ } 16s. \text{ } 10\frac{3}{4}d. \times 144.33 = £8 \text{ } 10s. \text{ } 8\frac{1}{2}d. \times 48.11; \text{ now } 8.25d. = .6875s.;$$

$$\text{hence } 170.6875s. \times 48.11 = 8211.775625s. = £410 \text{ } 11s. \text{ } 9.3075d. \text{ Ans.}$$

$$£9753 \text{ } 14s. \text{ } 8\frac{1}{4}d. + 234\frac{1}{2} = £39014 \text{ } 18s. \text{ } 9d. + 938 = £41 \text{ } 11s. \text{ } 10\frac{1}{2}d. \text{ Ans.}$$

$$(41) \quad £10 \times 3.275 = £32.75 = £32 \text{ } 15s. \text{ Ans.}$$

$$3.275 \times 12.8 = 41.92. \text{ Ans.}$$

$$.0625 \div .00005 = 6250 \div 5 = 1250. \text{ Ans.}$$

$$(42) \frac{11}{512} = \cdot 021484375. \text{ Ans.} \qquad \frac{2}{33} = \cdot 06. \text{ Ans.}$$

$$2\cdot 0325 = 2 \frac{325}{10000} = 2 \frac{13}{400}. \text{ Ans.}$$

$$\cdot 3405 = \frac{1}{10} \text{ of } 3 \frac{15}{37} = \frac{63}{185}. \text{ Ans.}$$

$$3 \text{ oz.} = \cdot 1875 \text{ lb.}; \text{ hence } 2\cdot 1875 \text{ lbs.} + 2240 \text{ lbs.} = \cdot 03125 + 32 \\ = \cdot 0009765625. \text{ Ans.}$$

$$(43) 1\cdot 75s. \div 20s. = \pounds \cdot 0875. \text{ Ans.}$$

$$2\frac{2}{3} \text{ of } \pounds 87708 \frac{1}{3} \times 2 = 1\cdot 7541 \frac{2}{3} \times 8 + 3 = 4\cdot 67. \text{ Ans.}$$

$$(44) 6\cdot 75d. = \cdot 5625s.; \text{ hence } 72\cdot 5625s. \times \frac{166}{43}$$

$$= 280\cdot 125s. = \pounds 14 \text{ Os. } 1\frac{1}{2}d. \text{ Ans.}$$

$$\text{Again, } 3\cdot 75d. = \cdot 3125s.$$

$$\text{hence } 280\cdot 125s. + 700\cdot 3125s. = \cdot 4. \text{ Ans.}$$

$$(45) 2\frac{4}{5} \text{ of } 2\frac{3}{11} + \frac{1}{10} \text{ of } 11\frac{4}{11} = 28 \times 25 \div 125 = \frac{28}{5};$$

$$\left( 4\frac{4}{9} - \frac{1}{10} \text{ of } 28\frac{1}{3} \right) + \left( 1\frac{2}{3} + 2\frac{17}{27} \right) = \frac{29}{18} + \frac{116}{27} = \frac{8}{3};$$

$$6\frac{4}{5} \times 3 + 2\frac{1}{4} = \frac{136}{15};$$

$$\text{hence } \frac{28}{5} + \frac{3}{8} \text{ of } \frac{136}{15} = \frac{28+17}{5} = 9. \text{ Ans.}$$

$$(46) \frac{4}{5} \text{ of } \pounds \frac{21}{20} \times 2\cdot 625 = \pounds 2\cdot 205 = \pounds 2 \text{ 4s. } 1\frac{1}{2}d. \text{ Ans.}$$

$$26\frac{1}{2} \text{ sq. po.} \quad \dots \quad = 26 \text{ po. } 15\cdot 125 \text{ yds.}$$

$$70\cdot 6 \text{ sq. yds.} + 30\cdot 25 \quad \dots \quad = 2 \quad 10\cdot 1$$

$$\underline{24 \text{ po.} \quad 5 \text{ 025 sq. yds.} \quad \text{Ans.}}$$

$$(47) \pounds 3\cdot 867708 \frac{1}{3} \times 6\cdot 8 \frac{1}{3} = \pounds 3 \text{ 17s. } 4\frac{1}{2}d. \times 6\frac{5}{6}$$

$$= \pounds 26 \text{ 8s. } 7\frac{1}{2}d.$$

$$\pounds 2\cdot 411458 \frac{1}{3} \times 5\cdot 8 = \pounds 2 \text{ 8s. } 2\frac{3}{4}d. \times 5\frac{4}{5}$$

$$= \pounds 13 \text{ 19s. } 8\frac{3}{4}d.$$

$$\pounds 4\cdot 375 \times 1\cdot 3 = \pounds 5\cdot 6875 = \pounds 5 \text{ 13s. } 9d.$$

$$\pounds 26 \text{ 8s. } 7\frac{1}{2}d. + \pounds 13 \text{ 19s. } 8\frac{3}{4}d. = \pounds 5 \text{ 13s. } 9d.$$

$$= \pounds 34 \text{ 14s. } 6\frac{1}{2}d. \text{ Ans.}$$

$$\begin{array}{rcl}
 (48) \quad +.2 = +.2; & +1 = +.2 \\
 \quad \times .04 & \\
 \hline
 -.2^2 = -.008; & +3 = -.00266667 \\
 \quad \times .04 & \\
 \hline
 +.2^3 = +.00032; & +5 = +.000064 \\
 \quad \times .04 & \\
 \hline
 -.2^7 = -.0000128; & +7 = -.00000183 \\
 \text{Nett sum,} & \underline{.1973955} \\
 & 16 \\
 & \hline
 & 3.158328 \\
 \frac{4}{333} = & \underline{.016736} \\
 & \underline{3.141592.} \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 (49) \quad £1.15 & = 23.0000s. \\
 2.0625 \text{ guin.} & = 43.3125s. \\
 .0078\frac{1}{8} \text{ of } 32s. & = 0.2500s. \\
 & \underline{66.5625s. = £3 \text{ } 6s. \text{ } 6\frac{3}{4}d.} \quad \text{Ans.} \\
 66.5625s. + 10s. & = 6.65625. \quad \text{Ans.}
 \end{array}$$

$$\begin{array}{rcl}
 (50) & 1)1.0 \\
 & 2)1.0 \\
 & 3).5 \\
 & 4).166666667 \\
 & 5).041666667 \\
 & 6).008333333 \\
 & 7).001388889 \\
 & 8).000198413 \\
 & 9).000024802 \\
 & 10).000002756 \\
 & 11).000000276 \\
 & 12).000000025 \\
 & \underline{.000000002} \\
 & \underline{2.718281830.} \quad \text{Ans.}
 \end{array}$$

## CHAPTER V.

## PRACTICE.

Ex. 48. (p. 75.)

$$\begin{array}{r}
 \text{(1)} \\
 29 @ £6 \text{ } 10s. \\
 6 \\
 10s. \left| \begin{array}{r} 174 \\ 14 \text{ } 10 \end{array} \right. \\
 \hline
 £188 \text{ } 10s. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(2)} \\
 43 @ £4 \text{ } 6s. \text{ } 8d. \\
 4 \\
 6s. \text{ } 8d. \left| \begin{array}{r} 172 \\ 14 \text{ } 6 \text{ } 8 \end{array} \right. \\
 \hline
 £186 \text{ } 6s. \text{ } 8d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(3)} \\
 57 @ £9 \text{ } 5s. \\
 9 \\
 5s. \left| \begin{array}{r} 513 \\ 14 \text{ } 5 \end{array} \right. \\
 \hline
 £527 \text{ } 5s. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(4)} \\
 62 @ £7 \text{ } 4s. \\
 7 \\
 4s. \left| \begin{array}{r} 434 \\ 12 \text{ } 8 \end{array} \right. \\
 \hline
 £446 \text{ } 8s. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(5)} \\
 71 @ £8 \text{ } 3s. \text{ } 4d. \\
 8 \\
 3s. \text{ } 4d. \left| \begin{array}{r} 568 \\ 11 \text{ } 16 \text{ } 8 \end{array} \right. \\
 \hline
 £579 \text{ } 16s. \text{ } 8d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(6)} \\
 87 @ £1 \text{ } 2s. \text{ } 6d. \\
 10 \\
 2s. \text{ } 6d. \left| \begin{array}{r} 10 \text{ } 17 \text{ } 6 \end{array} \right. \\
 \hline
 £97 \text{ } 17s. \text{ } 6d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(7)} \\
 89 @ £11 \text{ } 1s. \text{ } 8d. \\
 11 \\
 1s. \text{ } 8d. \left| \begin{array}{r} 979 \\ 7 \text{ } 8 \text{ } 4 \end{array} \right. \\
 \hline
 £986 \text{ } 8s. \text{ } 4d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(8)} \\
 95 @ £12 \text{ } 11s. \\
 12 \\
 10s. \left| \begin{array}{r} 1140 \\ 47 \text{ } 10 \end{array} \right. \\
 1s. \left| \begin{array}{r} 4 \text{ } 15 \end{array} \right. \\
 \hline
 £1192 \text{ } 5s. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(9)} \\
 47 @ £1 \text{ } 16s. \text{ } 8d. \\
 23 \\
 10s. \text{ } 0d. \left| \begin{array}{r} 15 \text{ } 13 \text{ } 4 \end{array} \right. \\
 6s. \text{ } 8d. \left| \begin{array}{r} 23 \text{ } 10 \end{array} \right. \\
 \hline
 £86 \text{ } 3s. \text{ } 4d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(10)} \\
 55 @ £4 \text{ } 13s. \text{ } 4d. \\
 4 \\
 6s. \text{ } 8d. \left| \begin{array}{r} 220 \\ 18 \text{ } 6 \text{ } 8 \end{array} \right. \\
 6s. \text{ } 8d. \left| \begin{array}{r} 18 \text{ } 6 \text{ } 8 \end{array} \right. \\
 \hline
 £256 \text{ } 13s. \text{ } 4d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(11)} \\
 61 @ £9 \text{ 11s. } 8d. \\
 9 \\
 \hline
 10s. \text{ Od. } \left| \begin{array}{r} 549 \\ 30 \text{ 10} \\ 5 \text{ 1 8} \end{array} \right. \\
 1s. \text{ 8d. } \left| \begin{array}{r} 584 \text{ 11s. } 8d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(12)} \\
 77 @ £2 \text{ 12s. } 6d. \\
 2 \\
 \hline
 10s. \text{ Od. } \left| \begin{array}{r} 154 \\ 38 \text{ 10} \\ 9 \text{ 12 6} \end{array} \right. \\
 2s. \text{ 6d. } \left| \begin{array}{r} 202 \text{ 2s. } 6d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

## EX. 49. (p. 75.)

$$\begin{array}{r}
 \text{(1)} \\
 27 @ £3 \text{ 15s. } \\
 3 \\
 \hline
 15s. \left| \begin{array}{r} 81 \\ 20 \text{ 5} \end{array} \right. \\
 \hline
 £101 \text{ 5s. } \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(2)} \\
 35 @ £5 \text{ 7s. } 6d. \\
 5 \\
 \hline
 5s. \text{ Od. } \left| \begin{array}{r} 175 \\ 8 \text{ 15} \\ 4 \text{ 7 6} \end{array} \right. \\
 2s. \text{ 6d. } \left| \begin{array}{r} 188 \text{ 2s. } 6d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(3)} \\
 39 @ £4 \text{ 12s. } \\
 4 \\
 \hline
 10s. \left| \begin{array}{r} 156 \\ 19 \text{ 10} \\ 3 \text{ 18} \end{array} \right. \\
 2s. \left| \begin{array}{r} 179 \text{ 8s. } \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(4)} \\
 41 @ £6 \text{ 17s. } 6d. \\
 5 \\
 \hline
 25s. \text{ Od. } \left| \begin{array}{r} 205 \\ 51 \text{ 5} \\ 25 \text{ 12 6} \end{array} \right. \\
 12s. \text{ 6d. } \left| \begin{array}{r} 281 \text{ 17s. } 6d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(5)} \\
 53 @ £7 \text{ 17s. } \\
 7 \\
 \hline
 7s. \left| \begin{array}{r} 371 \\ 18 \text{ 11} \\ 26 \text{ 10} \end{array} \right. \\
 10s. \left| \begin{array}{r} 416 \text{ 1s. } \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(6)} \\
 57 @ £1 \text{ 18s. } 6d. \\
 7 \\
 \hline
 10s. \text{ Od. } \left| \begin{array}{r} 28 \text{ 10} \\ 14 \text{ 5} \\ 7 \text{ 2 6} \\ 2 \text{ 17 0} \end{array} \right. \\
 5s. \text{ Od. } \left| \begin{array}{r} 109 \text{ 14s. } 6d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(7)} \\
 65 @ £11 \text{ 14s. } 6d. \\
 11 \\
 \hline
 10s. \text{ Od. } \left| \begin{array}{r} 715 \\ 32 \text{ 10} \\ 8 \text{ 2 6} \\ 6 \text{ 10 0} \end{array} \right. \\
 2s. \text{ 6d. } \left| \begin{array}{r} 762 \text{ 2s. } 6d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(8)} \\
 73 @ £7 \text{ 15s. } 6d. \\
 7 \\
 \hline
 10s. \text{ Od. } \left| \begin{array}{r} 511 \\ 36 \text{ 10} \\ 18 \text{ 5} \\ 1 \text{ 16 6} \end{array} \right. \\
 5s. \text{ Od. } \left| \begin{array}{r} 567 \text{ 11s. } 6d. \\ \hline \end{array} \right. \text{ Ans.}
 \end{array}$$

$$\begin{array}{r}
 \text{(9)} \\
 85 @ £1 \text{ } 6s. \text{ } 6d. \\
 \begin{array}{l} 5s. \text{ } 0d. \quad \frac{1}{12} \\ 1s. \text{ } 3d. \quad \frac{1}{4} \\ 3d. \quad \frac{1}{6} \end{array}
 \end{array}
 \begin{array}{r}
 21 \text{ } 5 \\
 5 \text{ } 6 \text{ } 3 \\
 1 \text{ } 1 \text{ } 3 \\
 \hline
 £112 \text{ } 12s. \text{ } 6d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(10)} \\
 89 @ £8 \text{ } 13s. \text{ } 6d. \\
 \begin{array}{l} 10s. \text{ } 0d. \quad \frac{1}{12} \\ 3s. \text{ } 4d. \quad \frac{1}{3} \\ 2d. \quad \frac{1}{20} \end{array}
 \end{array}
 \begin{array}{r}
 8 \\
 712 \\
 44 \text{ } 10 \\
 14 \text{ } 16 \text{ } 8 \\
 0 \text{ } 14 \text{ } 10 \\
 \hline
 £772 \text{ } 1s. \text{ } 6d. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(11)} \\
 92 @ £6 \text{ } 18s. \text{ } 9d. \\
 \begin{array}{l} 15s. \text{ } 0d. \quad \frac{1}{6} \\ 3s. \text{ } 9d. \quad \frac{1}{4} \end{array}
 \end{array}
 \begin{array}{r}
 6 \\
 552 \\
 69 \\
 17 \text{ } 5 \\
 \hline
 £638 \text{ } 5s. \text{ } Ans.
 \end{array}$$

$$\begin{array}{r}
 \text{(12)} \\
 97 @ £1 \text{ } 16s. \text{ } 9d. \\
 \begin{array}{l} 10s. \text{ } 0d. \quad \frac{1}{12} \\ 6s. \text{ } 8d. \quad \frac{1}{3} \\ 1d. \quad \frac{1}{80} \end{array}
 \end{array}
 \begin{array}{r}
 48 \text{ } 10 \\
 32 \text{ } 6 \text{ } 8 \\
 0 \text{ } 8 \text{ } 1 \\
 \hline
 £178 \text{ } 4s. \text{ } 9d. \text{ } Ans.
 \end{array}$$

### Ex. 50. (p. 76.)

\*\* In this set of Examples we have chosen 1s. as the relative integer, because the lower denominations in the price are more readily resolved into aliquot parts than when £1 is the integer; but we have subjoined the parts into which the entire price may be resolved with reference to the £1 integer.

$$\begin{array}{r}
 \text{(1)} \\
 27 @ 2s. \text{ } 1\frac{1}{2}d. \\
 2 \\
 \begin{array}{l} 1d. \quad \frac{1}{12} \\ \frac{1}{2}d. \quad \frac{1}{4} \end{array}
 \end{array}
 \begin{array}{r}
 54s. \\
 2 \text{ } 3 \\
 0 \text{ } 6\frac{3}{4} \\
 20) 56s. \text{ } 9\frac{3}{4}d. \\
 \hline
 £2 \text{ } 16s. \text{ } 9\frac{3}{4}d. \text{ } Ans. \\
 [Or, take 2s. = £\frac{1}{10}. \\
 1d. = \frac{1}{24} \text{ of } 2s., \&c.]
 \end{array}$$

$$\begin{array}{r}
 \text{(2)} \\
 49 @ 3s. \text{ } 2\frac{3}{4}d. \\
 3 \\
 \begin{array}{l} 2d. \quad \frac{1}{6} \\ \frac{1}{2}d. \quad \frac{1}{4} \\ \frac{1}{4}d. \quad \frac{1}{8} \end{array}
 \end{array}
 \begin{array}{r}
 147s. \\
 8 \text{ } 2 \\
 2 \text{ } 0\frac{1}{2} \\
 1 \text{ } 0\frac{1}{2} \\
 20) 158s. \text{ } 2\frac{3}{4}d. \\
 \hline
 £7 \text{ } 18s. \text{ } 2\frac{3}{4}d. \text{ } Ans. \\
 [Or, 2s. \text{ } 6d. + 7\frac{3}{4}d. + 1\frac{1}{4}d.]
 \end{array}$$

$$\begin{array}{r}
 \text{(3)} \\
 54 @ 4s. \text{ } 2\frac{1}{2}d. \\
 4 \\
 \begin{array}{l} 2d. \quad \frac{1}{6} \\ \frac{1}{2}d. \quad \frac{1}{4} \end{array}
 \end{array}
 \begin{array}{r}
 216s. \\
 9 \\
 2 \text{ } 3 \\
 20) 227s. \text{ } 3d. \\
 \hline
 £11 \text{ } 7s. \text{ } 3d. \text{ } Ans. \\
 [Or, 3s. \text{ } 4d. + 10d. + \frac{1}{2}d.]
 \end{array}$$

$$\begin{array}{r}
 \text{(4)} \\
 56 @ 4s. \text{ } 9\frac{3}{4}d. \\
 4 \\
 \begin{array}{l} 6d. \quad \frac{1}{3} \\ 3d. \quad \frac{1}{6} \\ \frac{3}{4}d. \quad \frac{1}{4} \end{array}
 \end{array}
 \begin{array}{r}
 224s. \\
 28 \\
 14 \\
 3 \text{ } 6 \\
 20) 269 \text{ } 6d. \\
 \hline
 £13 \text{ } 9s. \text{ } 6d. \text{ } Ans. \\
 [Or, 2s. + 2s. \text{ } 6d. + 3\frac{3}{4}d.]
 \end{array}$$

$$\begin{array}{r}
 (5) \\
 65 @ 5s. 7\frac{3}{4}d. \\
 5 \\
 \hline
 325s. \\
 \begin{array}{r}
 6d. \left| \begin{array}{r} 32 \quad 6 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 8 \quad 1\frac{1}{2} \\ 2d. \left| \begin{array}{r} 1 \quad 4\frac{1}{2} \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 8 \end{array} \right. \\
 2d. \left| \begin{array}{r} 1 \end{array} \right.
 \end{array}
 \end{array}
 \end{array}$$

$$20)366s. 11\frac{3}{4}d.$$

$$\underline{\pounds 18 \quad 6s. \quad 11\frac{3}{4}d.} \quad Ans.$$

$$[Or, 5s. + 7\frac{1}{2}d. + \frac{1}{4}d.]$$

$$\begin{array}{r}
 (6) \\
 73 @ 7s. 8\frac{1}{2}d. \\
 7 \\
 \hline
 511s. \\
 \begin{array}{r}
 6d. \left| \begin{array}{r} 36 \quad 6 \\ 2d. \left| \begin{array}{r} 12 \quad 2 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 3 \quad 0\frac{1}{2} \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 3 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)562s. 8\frac{1}{2}d.$$

$$\underline{\pounds 28 \quad 2s. \quad 8\frac{1}{2}d.} \quad Ans.$$

$$[Or, 6s. 8d. + 10d. + 2\frac{1}{2}d.]$$

$$\begin{array}{r}
 (7) \\
 77 @ 8s. 11\frac{1}{2}d. \\
 8 \\
 \hline
 616s. \\
 \begin{array}{r}
 6d. \left| \begin{array}{r} 38 \quad 6 \\ 4d. \left| \begin{array}{r} 25 \quad 8 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 9 \quad 7\frac{1}{2} \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 9 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)689s. 9\frac{1}{2}d.$$

$$\underline{\pounds 34 \quad 9s. \quad 9\frac{1}{2}d.} \quad Ans.$$

$$[Or, 3s. 4d. + 5s. + 7\frac{1}{2}d.]$$

$$\begin{array}{r}
 (8) \\
 84 @ 9s. 2\frac{3}{4}d. \\
 9 \\
 \hline
 756s. \\
 \begin{array}{r}
 2d. \left| \begin{array}{r} 14 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 3 \quad 6 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 1 \quad 9 \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 3 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)775s. 3d.$$

$$\underline{\pounds 38 \quad 15s. \quad 3d.} \quad Ans.$$

$$[Or, 6s. 8d. + 2s. 6d. + \frac{3}{4}d.]$$

$$\begin{array}{r}
 (9) \\
 89 @ 11s. 8\frac{3}{4}d. \\
 11 \\
 \hline
 979s. \\
 \begin{array}{r}
 6d. \left| \begin{array}{r} 44 \quad 6 \\ 2d. \left| \begin{array}{r} 14 \quad 10 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 5 \quad 6\frac{3}{4} \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 5 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)1043s. 10\frac{3}{4}d.$$

$$\underline{\pounds 52 \quad 3s. \quad 10\frac{3}{4}d.} \quad Ans.$$

$$[Or, 6s. 3d. + 5s. + \frac{3}{4}d.]$$

$$\begin{array}{r}
 (10) \\
 93 @ 13s. 5\frac{1}{2}d. \\
 13 \\
 \hline
 1209s. \\
 \begin{array}{r}
 4d. \left| \begin{array}{r} 31 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 11 \quad 7\frac{1}{2} \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 11 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)1251s. 7\frac{1}{2}d.$$

$$\underline{\pounds 62 \quad 11s. \quad 7\frac{1}{2}d.} \quad Ans.$$

$$[Or, 10s. + 3s. 4d. + 1\frac{1}{2}d.]$$

$$\begin{array}{r}
 (11) \\
 95 @ 14s. 4\frac{3}{4}d. \\
 14 \\
 \hline
 1330s. \\
 \begin{array}{r}
 3d. \left| \begin{array}{r} 23 \quad 9 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 11 \quad 10\frac{1}{2} \\ 1\frac{1}{2}d. \left| \begin{array}{r} 1 \quad 11\frac{1}{2} \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 11 \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 1 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)1367s. 7\frac{1}{4}d.$$

$$\underline{\pounds 68 \quad 7s. \quad 7\frac{1}{4}d.} \quad Ans.$$

$$[Or, 10s. + 3s. 4d. + 1s. + \frac{3}{4}d.]$$

$$\begin{array}{r}
 (12) \\
 99 @ 17s. 11\frac{1}{2}d. \\
 15 \\
 \hline
 1485s. \\
 \begin{array}{r}
 2s. 6d. \left| \begin{array}{r} 247 \quad 6 \\ 5d. \left| \begin{array}{r} 41 \quad 3 \\ 1\frac{1}{2}d. \left| \begin{array}{r} 6 \quad 2\frac{1}{2} \end{array} \right. \end{array} \right. \\
 1\frac{1}{2}d. \left| \begin{array}{r} 6 \end{array} \right.
 \end{array}
 \end{array}$$

$$20)1779s. 11\frac{1}{4}d.$$

$$\underline{\pounds 88 \quad 19s. \quad 11\frac{1}{4}d.} \quad Ans.$$

$$[Or, 10s. + 6s. 8d. + 1s. 3d. + \frac{3}{4}d.]$$



## EX. 51. (p. 77.)

- (1)  $135 @ (£3, - 8\frac{1}{2}d.)$
- |  |                |                  |
|--|----------------|------------------|
| <u>£405</u>                                      |                |                  |
| 4d.  | $\frac{1}{80}$ | 2 5              |
| 4d.  | $\frac{1}{80}$ | 2 5              |
| $\frac{1}{2}d.$                                  | $\frac{1}{8}$  | 5 $7\frac{1}{2}$ |
| <u>£4 15s. 7<math>\frac{1}{2}</math>d.</u>       |                |                  |
| <u>£400 4s. 4<math>\frac{1}{2}</math>d.</u> Ans. |                |                  |
- (2)  $217 @ (£5, - 2s. 4\frac{1}{2}d.)$
- |   |                |                    |
|---|----------------|--------------------|
| <u>£1085</u>                                      |                |                    |
| 2s. 0d.   | $\frac{1}{10}$ | 21 14              |
| 4d.   | $\frac{1}{40}$ | 3 12 4             |
| $\frac{1}{2}d.$                                   | $\frac{1}{16}$ | 0 4 $6\frac{1}{2}$ |
| <u>£25 10s. 10<math>\frac{1}{2}</math>d.</u>      |                |                    |
| <u>£1059 9s. 1<math>\frac{1}{2}</math>d.</u> Ans. |                |                    |
- (3)  $273 @ (£4, - 1s. 7\frac{1}{4}d.)$
- |   |                |                    |
|---|----------------|--------------------|
| <u>£1092</u>                                      |                |                    |
| 1s. 3d.   | $\frac{1}{12}$ | 17 1 3             |
| 3d.   | $\frac{1}{4}$  | 3 8 3              |
| $1\frac{1}{4}d.$                                  | $\frac{1}{12}$ | 1 8 $5\frac{1}{2}$ |
| <u>£21 17s. 11<math>\frac{1}{2}</math>d.</u>      |                |                    |
| <u>£1070 2s. 0<math>\frac{3}{4}</math>d.</u> Ans. |                |                    |
- (4)  $322 @ (£8, - 5s. 6\frac{1}{2}d.)$
- |                            |                |        |
|----------------------------|----------------|--------|
| <u>£2576</u>               |                |        |
| 5s. 0d.                    | $\frac{1}{4}$  | 80 10  |
| 6d.                        | $\frac{1}{10}$ | 8 1    |
| $\frac{1}{2}d.$            | $\frac{1}{12}$ | 0 13 5 |
| <u>£89 4s. 5d.</u>         |                |        |
| <u>£2486 15s. 7d.</u> Ans. |                |        |
- (5)  $289 @ (10s. - 15\frac{1}{2}d.):$  Or thus;  $289 @ 8s. 8\frac{1}{2}d.$
- |  |                |                     |
|--|----------------|---------------------|
| <u>£144 10</u>                               |                |                     |
| 10s. 0d.                                     | $\frac{1}{2}$  | 144 10              |
| 1s. 3d.                                      | $\frac{1}{4}$  | 18 1                |
| $\frac{1}{2}d.$                              | $\frac{1}{30}$ | 0 12 $0\frac{1}{2}$ |
| <u>£18 13s. 3<math>\frac{1}{2}</math>d.</u>  |                |                     |
| <u>£125 16s. 8<math>\frac{1}{2}</math>d.</u> |                |                     |
- (6)  $373 @ (10s. - 4\frac{1}{2}d.)$
- |   |                |                    |
|---|----------------|--------------------|
| <u>£186 10</u>                                |                |                    |
| 10s. 0d.                                      | $\frac{1}{2}$  | 186 10             |
| 4d.   | $\frac{1}{40}$ | 6 4 4              |
| $\frac{1}{2}d.$                               | $\frac{1}{16}$ | 0 7 $9\frac{1}{2}$ |
| <u>£6 12s. 1<math>\frac{1}{2}</math>d.</u>    |                |                    |
| <u>£179 17s. 10<math>\frac{3}{4}</math>d.</u> |                |                    |
- (7)  $431 @ (£6, - 2s. 0\frac{1}{2}d.)$
- |   |                |                      |
|---|----------------|----------------------|
| <u>£2586</u>                                      |                |                      |
| 1s. 8d.   | $\frac{1}{12}$ | 35 18 4              |
| 4d.   | $\frac{1}{10}$ | 7 3 8                |
| $\frac{1}{2}d.$                                   | $\frac{1}{8}$  | 0 17 $11\frac{1}{2}$ |
| <u>£43 19s. 11<math>\frac{1}{2}</math>d.</u>      |                |                      |
| <u>£2542 0s. 0<math>\frac{1}{2}</math>d.</u> Ans. |                |                      |
- (8)  $397 @ (£7, - 4s. 2d.):$  Or thus;  $397 @ £6 15s. 10d.$
- |                       |                |       |
|-----------------------|----------------|-------|
| <u>£2779</u>          |                |       |
| 2s. 0d.               | $\frac{1}{10}$ | 39 14 |
| 2s. 0d.               | $\frac{1}{10}$ | 39 14 |
| 2d.                   | $\frac{1}{12}$ | 3 6 2 |
| <u>£82 14s. 2d.</u>   |                |       |
| <u>£2696 5s. 10d.</u> |                |       |
- (9)  $2382 @ (£6, - 2s. 0\frac{1}{2}d.)$
- |                            |                |          |
|----------------------------|----------------|----------|
| <u>£2382</u>               |                |          |
| 15s. 0d.                   | $\frac{1}{8}$  | 297 15   |
| 10d.                       | $\frac{1}{18}$ | 16 10 10 |
| <u>£2696 5s. 10d.</u> Ans. |                |          |

$$\begin{array}{r}
 (9) \\
 511 @ (8s. - 1\frac{1}{4}d.) \\
 8 \\
 \hline
 4088s. \\
 1d. \left| \begin{array}{r} 42 \quad 7 \\ 10 \quad 7\frac{3}{4} \\ 53 \quad 2\frac{3}{4} \end{array} \right. \\
 20)4034s. \quad 9\frac{1}{4}d. \\
 \hline
 \underline{\underline{\pounds 201 \quad 14s. \quad 9\frac{1}{4}d.}} \quad Ans.
 \end{array}$$

$$\begin{array}{r}
 (10) \\
 623 @ (12s. - 2\frac{3}{4}d.) \\
 6 \\
 \hline
 3738s. \\
 12s. 0d. \left| \begin{array}{r} 5 \quad 3 \quad 10 \\ 1 \quad 5 \quad 11\frac{1}{4} \\ 0 \quad 12 \quad 11\frac{1}{4} \end{array} \right. \\
 2d. \left| \begin{array}{r} 5 \quad 3 \quad 10 \\ 1 \quad 5 \quad 11\frac{1}{4} \\ 0 \quad 12 \quad 11\frac{1}{4} \end{array} \right. \\
 \frac{1}{2}d. \left| \begin{array}{r} 5 \quad 3 \quad 10 \\ 1 \quad 5 \quad 11\frac{1}{4} \\ 0 \quad 12 \quad 11\frac{1}{4} \end{array} \right. \\
 \hline
 \pounds 7 \quad 2s. \quad 9\frac{1}{4}d. \\
 \hline
 \underline{\underline{\pounds 366 \quad 13s. \quad 2\frac{3}{4}d.}} \quad Ans.
 \end{array}$$

$$\begin{array}{r}
 (11) \\
 271 @ \pounds 7. - 4s \quad 1\frac{1}{2}d. \\
 7 \\
 \hline
 \pounds 1897 \\
 4s. 0d. \left| \begin{array}{r} 54 \quad 4 \\ 1 \quad 2 \quad 7 \\ 0 \quad 5 \quad 7\frac{3}{4} \end{array} \right. \\
 1d. \left| \begin{array}{r} 54 \quad 4 \\ 1 \quad 2 \quad 7 \\ 0 \quad 5 \quad 7\frac{3}{4} \end{array} \right. \\
 \frac{1}{4}d. \left| \begin{array}{r} 54 \quad 4 \\ 1 \quad 2 \quad 7 \\ 0 \quad 5 \quad 7\frac{3}{4} \end{array} \right. \\
 \hline
 \pounds 55 \quad 12s. \quad 2\frac{3}{4}d. \\
 \hline
 \underline{\underline{\pounds 1841 \quad 7s. \quad 9\frac{1}{4}d.}} \quad Ans.
 \end{array}$$

$$\begin{array}{r}
 (12) \\
 333 @ (\pounds 6. - 1s. 0\frac{1}{2}d.) \\
 6 \\
 \hline
 \pounds 1998 \\
 1s. 0d. \left| \begin{array}{r} 16 \quad 13 \\ 0 \quad 13 \quad 10\frac{1}{2}d. \\ \pounds 17 \quad 6s. \quad 10\frac{1}{2}d. \end{array} \right. \\
 \frac{1}{2}d. \left| \begin{array}{r} 16 \quad 13 \\ 0 \quad 13 \quad 10\frac{1}{2}d. \\ \pounds 17 \quad 6s. \quad 10\frac{1}{2}d. \end{array} \right. \\
 \hline
 \underline{\underline{\pounds 1980 \quad 13s. \quad 1\frac{1}{2}d.}} \quad Ans.
 \end{array}$$

## Ex. 52. (p.78.)

$$\begin{array}{r}
 (1) \\
 6 \text{ cwt. } 1 \text{ qr. } 11 \text{ lbs.} \\
 @ \pounds 2 \quad 17s. \quad 9d. \text{ per cwt.} \\
 6 \\
 \hline
 1qr. 0lb. \left| \begin{array}{r} 17 \quad 6 \quad 6 \\ 0 \quad 14 \quad 5\frac{1}{2} \\ 0 \quad 2 \quad 0\frac{3}{4} \\ 0 \quad 3 \quad 7\frac{5}{8} \end{array} \right. \\
 4lbs. \left| \begin{array}{r} 17 \quad 6 \quad 6 \\ 0 \quad 14 \quad 5\frac{1}{2} \\ 0 \quad 2 \quad 0\frac{3}{4} \\ 0 \quad 3 \quad 7\frac{5}{8} \end{array} \right. \\
 7lbs. \left| \begin{array}{r} 17 \quad 6 \quad 6 \\ 0 \quad 14 \quad 5\frac{1}{2} \\ 0 \quad 2 \quad 0\frac{3}{4} \\ 0 \quad 3 \quad 7\frac{5}{8} \end{array} \right. \\
 \hline
 \underline{\underline{\pounds 18 \quad 6s. \quad 7\frac{5}{16}d.}} \quad Ans.
 \end{array}$$

$$\begin{array}{r}
 (2) \\
 3 \text{ cwt. } 3 \text{ qrs. } 5 \text{ lb.} \\
 @ \pounds 4 \quad 14s. \text{ per cwt.} \\
 3 \\
 \hline
 3qrs. 0lb. \left| \begin{array}{r} 14 \quad 2 \\ 3 \quad 10 \quad 6 \\ 0 \quad 3 \quad 4\frac{1}{2} \\ 0 \quad 0 \quad 10\frac{1}{4} \end{array} \right. \\
 4lbs. \left| \begin{array}{r} 14 \quad 2 \\ 3 \quad 10 \quad 6 \\ 0 \quad 3 \quad 4\frac{1}{2} \\ 0 \quad 0 \quad 10\frac{1}{4} \end{array} \right. \\
 1lb. \left| \begin{array}{r} 14 \quad 2 \\ 3 \quad 10 \quad 6 \\ 0 \quad 3 \quad 4\frac{1}{2} \\ 0 \quad 0 \quad 10\frac{1}{4} \end{array} \right. \\
 \hline
 \underline{\underline{\pounds 17 \quad 16s. \quad 8\frac{5}{14}d.}} \quad Ans.
 \end{array}$$

$$\begin{array}{r}
 (3) \\
 9 \text{ cwt. } 21 \text{ lbs.} \\
 @ \pounds 5 \quad 11s. \quad 1\frac{1}{2}d. \text{ per cwt.} \\
 9 \\
 \hline
 14 \text{ lbs.} \left| \begin{array}{r} 50 \quad 0 \quad 1\frac{1}{2} \\ 0 \quad 13 \quad 10\frac{1}{4} \\ 0 \quad 6 \quad 11\frac{1}{8} \end{array} \right. \\
 7 \text{ lbs.} \left| \begin{array}{r} 50 \quad 0 \quad 1\frac{1}{2} \\ 0 \quad 13 \quad 10\frac{1}{4} \\ 0 \quad 6 \quad 11\frac{1}{8} \end{array} \right. \\
 \hline
 \underline{\underline{\pounds 51 \quad 0s. \quad 11\frac{1}{16}d.}} \quad Ans.
 \end{array}$$

$$\begin{array}{r}
 (4) \\
 2 \text{ cwt. } 4 \text{ lbs. } 12 \text{ oz.} \\
 @ \pounds 3 \quad 1s. \text{ per cwt.} \\
 2 \\
 \hline
 4lbs. 0oz. \left| \begin{array}{r} 6 \quad 2 \\ 0 \quad 2 \quad 2\frac{1}{2} \\ 0 \quad 0 \quad 3\frac{1}{8} \\ 0 \quad 0 \quad 1\frac{1}{16} \end{array} \right. \\
 8oz. \left| \begin{array}{r} 6 \quad 2 \\ 0 \quad 2 \quad 2\frac{1}{2} \\ 0 \quad 0 \quad 3\frac{1}{8} \\ 0 \quad 0 \quad 1\frac{1}{16} \end{array} \right. \\
 4oz. \left| \begin{array}{r} 6 \quad 2 \\ 0 \quad 2 \quad 2\frac{1}{2} \\ 0 \quad 0 \quad 3\frac{1}{8} \\ 0 \quad 0 \quad 1\frac{1}{16} \end{array} \right. \\
 \hline
 \underline{\underline{\pounds 6 \quad 4s. \quad 7\frac{5}{16}d.}} \quad Ans.
 \end{array}$$

(5)

89 lbs. 9 oz.  
@ £2 14s. 6d. per lb.

			89			
			242	10	6	
8 oz.	$\frac{1}{8}$		1	7	3	
1 oz.	$\frac{1}{8}$		0	3	$4\frac{7}{8}$	
			£244	1s.	$1\frac{7}{8}d.$	Ans.

(7)

56 lbs. 7 oz. 9 drs.  
@ £0 18s. 6d. per lb.

			8			
			7	8	0	
1 oz. 0 drs.	$\frac{1}{16}$		0	1	$1\frac{7}{8}$	
			7	9	$1\frac{7}{8}$	
			7			
			52	4	$1\frac{1}{2}$	
8 drs.	$\frac{1}{8}$		0	0	$6\frac{1}{2}$	
1 dr.	$\frac{1}{8}$		0	0	$0\frac{11}{16}$	
			£52	4s.	$8\frac{11}{16}d.$	Ans.

(9)

4 cwt. - 4 drs. @ £7.  
£7 per cwt.

			7			
			0	1	3	
1 lb.	$\frac{1}{112}$		0	0	$0\frac{15}{16}$	
1 oz.	$\frac{1}{16}$		0	0	$0\frac{15}{16}$	
4 drs.	$\frac{1}{4}$		0	0	$0\frac{15}{16}$	
			£27	19s.	$11\frac{49}{64}d.$	Ans.

(11)

41 oz. 14 dwt. 12 grs.  
@ £0 17s. 6d. per oz.

			41			
			35	17	6	
10 dwt.	$\frac{1}{80}$		0	8	9	
4 dwt.	$\frac{1}{20}$		0	3	6	
12 grs.	$\frac{1}{10}$		0	0	$5\frac{1}{4}$	
			£36	10s.	$2\frac{1}{4}d.$	Ans.

(13)

40 ft. 7 in.  
@ £0 9s. 4d. per ft.

			40			
			18	13	4	
6 in.	$\frac{1}{20}$		0	4	8	
1 in.	$\frac{1}{20}$		0	0	$9\frac{1}{5}$	
			£18	18s.	$9\frac{1}{5}d.$	Ans.

(6)

65 lbs. 13 oz.  
@ £0 15s. 9d. per lb.

			65			
			51	3	9	
13 oz.	$\frac{1}{80}$		0	12	$9\frac{9}{16}$	
			£51	16s.	$6\frac{9}{16}d.$	Ans.

(8)

226 lbs. 2 oz. 12 drs.  
@ £1 3s. 9d. per lb.

			226			
			268	7	$6\frac{1}{2}$	
2 oz. 0 drs.	$\frac{1}{80}$		0	2	$11\frac{5}{8}$	
8 drs.	$\frac{1}{10}$		0	0	$8\frac{3}{4}$	
4 drs.	$\frac{1}{5}$		0	0	$4\frac{3}{4}$	
			£268	11s.	$6\frac{3}{4}d.$	Ans.

(10)

7 oz. - 1 dwt. 4 grs.  
@ £0 7s. 9d. per oz.

			7			
			£2	14	3	
1 dwt.	$\frac{1}{20}$		0	0	$4\frac{13}{20}$	
4 grs.	$\frac{1}{5}$		0	0	$0\frac{13}{10}$	
			£0	0s.	$5\frac{17}{40}d.$	
			£2	13s.	$9\frac{23}{40}d.$	Ans.

(12)

11 yds. 1 ft. 1 in.  
@ £1 17s. 4d. per yd.

			11			
			20	10	8	
1 ft.	$\frac{1}{3}$		0	12	$5\frac{1}{3}$	
1 in.	$\frac{1}{12}$		0	1	$0\frac{1}{12}$	
			£21	4s.	$1\frac{7}{12}d.$	Ans.

(14)

37 ac. 1 ro. 28 po.  
@ £2 2s. per ac.

			37			
			77	14		
1 ro.	$\frac{1}{4}$		0	10	6	
20 po.	$\frac{1}{5}$		0	5	3	
8 po.	$\frac{1}{5}$		0	2	$1\frac{1}{5}$	
			£78	11s.	$10\frac{1}{5}d.$	Ans.

(15)  
18 ac. - 21 po.  
@ £5 18s. 6d. per ac.  
18  
106 13 0  
20 po. |  $\frac{1}{20}$  0 14 9 $\frac{3}{4}$   
1 po. |  $\frac{1}{20}$  0 0 8 $\frac{3}{4}$   
£0 15s. 6 $\frac{1}{2}$ d.  
£105 17s. 5 $\frac{1}{2}$ d. *Ans.*

(16)  
21 ac. 2 ro. 12 po.  
@ £3 15s. 8d. per ac.  
21  
79 9 0  
2 ro. |  $\frac{1}{20}$  1 17 10  
10 po. |  $\frac{1}{20}$  0 4 8 $\frac{3}{4}$   
2 po. |  $\frac{1}{20}$  0 0 11 $\frac{7}{8}$   
£81 12s. 6 $\frac{1}{10}$ d. *Ans.*

(17)  
23 wks. 4 da.  
@ £0 17s. 6d. per wk.  
23  
20 2 6  
3 $\frac{1}{2}$  da. |  $\frac{1}{2}$  0 8 9  
 $\frac{1}{2}$  da. |  $\frac{1}{2}$  0 1 3  
£20 12s. 6d. *Ans.*

(18)  
7 mo. 2 wks. 5 da.  
@ £2 8s. 4d. per mo.  
7  
16 18 4  
2 wks. |  $\frac{1}{4}$  1 4 2  
4 da. |  $\frac{1}{4}$  0 6 10 $\frac{3}{4}$   
1 da. |  $\frac{1}{4}$  0 1 8 $\frac{3}{4}$   
£18 11s. 1 $\frac{3}{4}$ d. *Ans.*

(19)  
38 wks. - 1 da.  
@ £1 2s. 9d. per wk.  
38  
43 4 6  
1 da. |  $\frac{1}{4}$  0 3 3  
£43 1s. 3d. *Ans.*

(20)  
6 mo. 3 wks. 2 da.  
@ £3 0s. 6d. per mo.  
6  
18 3 0  
3 wks. |  $\frac{1}{4}$  2 5 4 $\frac{1}{2}$   
2 da. |  $\frac{1}{4}$  0 4 3 $\frac{3}{4}$   
£20 12s. 8 $\frac{5}{14}$ d. *Ans.*

## MISCELLANEOUS EXAMPLES.

## Ex. 53. (p. 79.)

(1)  
721 @ (£1, - 2s. 7 $\frac{1}{2}$ d.)  
2s. 6d. |  $\frac{1}{20}$  90 2 6  
1 $\frac{1}{2}$ d. |  $\frac{1}{20}$  4 10 1 $\frac{1}{2}$   
£94 12s. 7 $\frac{1}{2}$ d.  
£626 7s. 4 $\frac{1}{2}$ d. *Ans.*

(2)  
2752 @ £2 4s. 10 $\frac{1}{2}$ d.  
2  
5504  
4s. |  $\frac{1}{4}$  550 8  
6d. |  $\frac{1}{4}$  68 16  
3d. |  $\frac{1}{4}$  34 8  
1 $\frac{1}{2}$ d. |  $\frac{1}{4}$  17 4  
£6174 16s. *Ans.*

$$\begin{array}{r}
 (3) \\
 244181 @ 2s. 3d. \\
 2s. \left| \begin{array}{r} 10 \\ 24418 \end{array} \right| 2 \\
 3d. \left| \begin{array}{r} 8 \\ 3052 \end{array} \right| 5 \quad 3 \\
 \hline
 \underline{\underline{\pounds 27470 \quad 7s. 3d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (4) \\
 7357 @ 12s. 9\frac{3}{4}d. \\
 10s. 0d. \left| \begin{array}{r} 1 \\ 3678 \end{array} \right| 10 \\
 2s. 6d. \left| \begin{array}{r} 1 \\ 919 \end{array} \right| 12 \quad 6 \\
 3\frac{3}{4}d. \left| \begin{array}{r} 1 \\ 114 \end{array} \right| 19 \quad 0\frac{3}{4} \\
 \hline
 \underline{\underline{\pounds 4713 \quad 1s. 6\frac{3}{4}d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (5) \\
 365 @ \pounds 28 4s. 4d. \\
 28 \\
 4s. \left| \begin{array}{r} 1 \\ 10220 \end{array} \right| 73 \\
 4d. \left| \begin{array}{r} 12 \\ 6 \end{array} \right| 1 \quad 8 \\
 \hline
 \underline{\underline{\pounds 10299 \quad 1s. 8d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (6) \\
 9 \text{ mo.} - 1 \text{ wk.} \\
 @ \pounds 5 10s. 6d. \text{ per mo.} \\
 9 \\
 1 \text{ wk.} \left| \begin{array}{r} 1 \\ 49 \end{array} \right| 14 \quad 6 \\
 \left| \begin{array}{r} 1 \\ 1 \end{array} \right| 7 \quad 7\frac{1}{2} \\
 \hline
 \underline{\underline{\pounds 48 \quad 6s. 10\frac{1}{2}d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (7) \\
 8 \text{ oz. } 9 \text{ dwt. } 20 \text{ grs.} \\
 @ \pounds 4 \quad 3s. 9d. \text{ per oz.} \\
 8 \\
 4 \text{ dwt.} \left| \begin{array}{r} 1 \\ 33 \end{array} \right| 10 \quad 0 \\
 5 \text{ dwt.} \left| \begin{array}{r} 1 \\ 0 \end{array} \right| 16 \quad 9 \\
 20 \text{ grs.} \left| \begin{array}{r} 1 \\ 1 \end{array} \right| 0 \quad 11\frac{1}{2} \\
 \left| \begin{array}{r} 1 \\ 0 \end{array} \right| 3 \quad 5\frac{7}{8} \\
 \hline
 \underline{\underline{\pounds 35 \quad 11s. 2\frac{1}{8}d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (8) \\
 13s. 4\frac{1}{2}d. \text{ per } \pounds \\
 \text{on } \pounds 1710 14s. 6d. \\
 10s. 0d. \left| \begin{array}{r} 1 \\ 855 \end{array} \right| 7 \quad 3 \\
 3s. 4d. \left| \begin{array}{r} 1 \\ 285 \end{array} \right| 2 \quad 5 \\
 \frac{1}{2}d. \left| \begin{array}{r} 1 \\ 3 \end{array} \right| 11 \quad 3\frac{29}{80} \\
 \hline
 \underline{\underline{\pounds 1144 \quad 0s. 11\frac{29}{80}d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (9) \\
 53 @ (6 \text{ ac.} - 14 \text{ po.}) \\
 6 \\
 318 \text{ ac.} \\
 10 \text{ po.} \left| \begin{array}{r} 1 \\ 3 \end{array} \right| 1 \quad 10 \\
 4 \text{ po.} \left| \begin{array}{r} 1 \\ 1 \end{array} \right| 1 \quad 12 \\
 \hline
 4 \text{ ac. } 2 \text{ ro. } 22 \text{ po.} \\
 \underline{\underline{313 \text{ ac. } 1 \text{ ro. } 18 \text{ po.} \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (10) \\
 5755 @ (1s. 8d. - \frac{1}{2}d.) \\
 1s. 8d. \left| \begin{array}{r} 1 \\ 479 \end{array} \right| 11 \quad 8 \\
 \frac{1}{2}d. \left| \begin{array}{r} 1 \\ 5 \end{array} \right| 19 \quad 10\frac{1}{2} \\
 \hline
 \underline{\underline{\pounds 473 \quad 11s. 9\frac{1}{2}d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (11) \\
 2468 @ 15s. 6d. \\
 10s. \left| \begin{array}{r} 1 \\ 1234 \end{array} \right| \\
 5s. \left| \begin{array}{r} 1 \\ 617 \end{array} \right| \\
 6d. \left| \begin{array}{r} 1 \\ 61 \end{array} \right| 14 \\
 \hline
 \underline{\underline{\pounds 1912 \quad 14s. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (12) \\
 1000 @ 6 \text{ dwt. } 7 \text{ grs.} \\
 6 \text{ dwt.} \left| \begin{array}{r} 1 \\ 25 \end{array} \right| \text{lbs. } 0 \text{ oz. } 0 \text{ dwt. } 0 \text{ gr.} \\
 6 \text{ grs.} \left| \begin{array}{r} 1 \\ 1 \end{array} \right| 0 \quad 0 \quad 0 \\
 1 \text{ gr.} \left| \begin{array}{r} 1 \\ 0 \end{array} \right| 2 \quad 1 \quad 16 \\
 \hline
 \underline{\underline{Ans. \quad 26 \text{ lbs. } 2 \text{ oz. } 11 \text{ dwt. } 16 \text{ gr.}}}
 \end{array}$$

$$\begin{array}{r}
 (13) \\
 365 @ 12s. 3d. \\
 10s. \left| \begin{array}{r} 1 \\ 182 \end{array} \right| 10 \\
 2s. \left| \begin{array}{r} 1 \\ 36 \end{array} \right| 10 \\
 3d. \left| \begin{array}{r} 1 \\ 4 \end{array} \right| 11 \quad 3 \\
 \hline
 \underline{\underline{\pounds 223 \quad 11s. 3d. \quad Ans.}}
 \end{array}$$

$$\begin{array}{r}
 (14) \\
 4)2300 \\
 575 @ 2s. 9\frac{3}{4}d. \\
 2s. 6d. \left| \begin{array}{r} 1 \\ 71 \end{array} \right| 17 \quad 6 \\
 3\frac{3}{4}d. \left| \begin{array}{r} 1 \\ 8 \end{array} \right| 19 \quad 8\frac{1}{4} \\
 \hline
 \underline{\underline{\pounds 80 \quad 17s. 2\frac{1}{4}d. \quad Ans.}}
 \end{array}$$

(15)  
39 wks. @ 13s. 6d.

6s. 8d.	$\frac{1}{2}$	13	
6s. 8d.	$\frac{1}{2}$	13	
2d.	$\frac{1}{40}$	0 6 6	
		<u>£26 6s. 6d.</u>	Ans.

(16)  
160 @ 17s. 1d.

16s.	$\frac{1}{8}$	£128 0s.	
1s.	$\frac{1}{20}$	8 0	
1d.	$\frac{1}{12}$	0 13 4	
		<u>£136 13s. 4d.</u>	Ans.

Also, £100 + 160 = £0 12s 6d.  
£2 1s. 3d. + 12s. 6d. = £2 13s. 9d.  
Ans.

(17) 1s. 8d.  $\times 6 = 10s.$  a wk.; and 377 @ 10s. = £188 10s. Ans.

(18)  
2s.  $9\frac{1}{2}d.$  per £  
on £1384 16s.

2s. 6d.	$\frac{1}{6}$	173 2	
3d.	$\frac{1}{10}$	17 6	$2\frac{1}{2}$
$\frac{1}{2}d.$	$\frac{1}{6}$	2 17	$8\frac{1}{2}$
		<u>£193 5s. <math>10\frac{1}{2}d.</math></u>	
		<u>£1191 10s. <math>1\frac{1}{2}d.</math></u>	Ans.

(19)  
3046  
5200  
8246 @ £3 2s. 6d.

2s. 6d.	$\frac{1}{6}$	<u>24738</u>	
		1030 15	
		<u>£25768 15s.</u>	Ans.

(20) Circuit of walls =  $(18\frac{5}{8} + 16\frac{1}{2})$  ft.  $\times 2 = 70\frac{3}{4}$  lineal feet.  
 $70\frac{3}{4}$  sq. ft.  $\times 10\frac{1}{2} = 724\frac{1}{8}$  sq. ft. @  $2\frac{1}{2}d.$  per ft.  
 $724\frac{1}{8}$  ft. @ 1s. = £36 4s. 4d.

2d.	$\frac{1}{6}$	6 0	$8\frac{1}{2}$
$\frac{1}{2}d.$	$\frac{1}{12}$	0 10	$0\frac{13}{16}$
		<u>£6 10s. <math>9\frac{7}{16}d.</math></u>	Ans.

(21)  
134 ac. 3 ro. 16 po.  
@ £2 12s. 6d. per ac.

2 ro.	$\frac{1}{2}$	351 15 0	
1 ro.	$\frac{1}{2}$	1 6 3	
16 po.	$\frac{1}{4}$	0 13 $1\frac{1}{2}$	
		0 5 3	
		<u>£353 19 <math>7\frac{1}{2}</math></u>	
		180 10 3	
		<u>£173 9s. <math>4\frac{1}{2}d.</math></u>	Ans.

51 ac. 2 ro. 12 po.  
@ £3 10s. per ac.

2 ro.	$\frac{1}{2}$	178 10
8 po.	$\frac{1}{2}$	1 15
4 po.	$\frac{1}{2}$	0 3 6
		0 1 9
		<u>£180 10s. 3d.</u>

(22)  
13s.  $7\frac{1}{2}d.$  per £  
on £3759 17s. 6d.

10s. 0d.	$\frac{1}{2}$	1879 8 9	
3s. 4d.	$\frac{1}{4}$	626 9 7	
3d.	$\frac{1}{10}$	46 19 $8\frac{5}{8}$	
$\frac{1}{2}d.$	$\frac{1}{6}$	7 16 $7\frac{1}{8}$	
		<u>£2560 14s. <math>8\frac{1}{16}d.</math></u>	Ans.

(23)  
 $1\frac{3}{8}$  sq. ft.  $\times 1\frac{1}{4} \times 8 \times 4$   
=  $\frac{1}{2}$  of 200 sq. ft. @ 11s.  $7\frac{1}{2}d.$   
= 200 sq. ft. @ 3s.  $10\frac{1}{2}d.$

3s. 4d.	$\frac{1}{4}$	33 6 8	
6d.	$\frac{1}{10}$	5 0 0	
$\frac{1}{2}d.$	$\frac{1}{12}$	0 8 4	
		<u>£38 15s. 0d.</u>	Ans.

(24)

$$7\frac{5}{8} \times 1\frac{1}{2} \times 2\frac{1}{2} = 33\frac{13}{32} \text{ c. ft. @ } 1\text{s. } 3\frac{1}{2}\text{d.}$$

33		
2	2	7 $\frac{1}{2}$
0	0	2 $\frac{7}{8}$
0	0	0 $\frac{31}{32}$
<u>£2 2s. 10<math>\frac{103}{32}</math>d.</u>		

*Ans.*

$$76\frac{1}{2} \text{ ac. @ } £13 \text{ } 15 \text{ } 9$$

76 $\frac{1}{2}$		
1047	17	0
3	8	11 $\frac{1}{4}$
<u>£1051 5 11<math>\frac{1}{4}</math></u>		

=

(26)

$$8 \text{ cwt. } 2 \text{ qrs. } 14 \text{ lbs. @ } £2 \text{ } 0\text{s. } 6\text{d.}$$

8		
16	4	0
1	0	3
0	5	0 $\frac{3}{4}$
<u>£17 9 3<math>\frac{3}{4}</math></u>		
9 19 8 $\frac{1}{2}$		
<u>£27 9s. 7<math>\frac{1}{2}</math>d.</u>		

*Ans.*

(25)

$$60 \text{ ac. } - \frac{1}{2} \text{ ac. @ } £12 \text{ } 7\text{s. } 10\text{d. per ac.}$$

60		
743	10	0
6	3	11
<u>£737 6s. 1d.</u>		

Also, 78 ac. 24 po. @ £8 4s. 3d.

$$78\frac{3}{20} = £78 \text{ } 3\text{s.}$$

8		
625	4	
15	12	7 $\frac{1}{2}$
0	19	6 $\frac{9}{20}$
<u>1051 5 11<math>\frac{1}{4}</math></u>		
737 6 1		
<u>£2430 8s. 1<math>\frac{9}{10}</math>d.</u>		

*Ans.*

6 cwt. 1 qr. 10 lbs. @ £1 11s. 6d.

6		
9	9	0
0	7	10 $\frac{1}{2}$
0	2	3
<u>0 0 6<math>\frac{3}{4}</math></u>		
£9 19s. 8 $\frac{1}{4}$ d.		

*Ans.*

## CHAPTER VI.

## PROPORTION.

**Ex. 54.** (p.83.)

$$\begin{array}{l}
 (1) \quad \left. \begin{array}{l}
 ? : 2 :: 3 : 4; \therefore 4 : 3 :: 2 : 1\frac{1}{2} \\
 2 : ? :: 3 : 4; \therefore 3 : 4 :: 2 : 2\frac{2}{3} \\
 2 : 3 :: ? : 4; \therefore 3 : 2 :: 4 : 2\frac{2}{3} \\
 2 : 3 :: 4 : ?; \text{ or } 2 : 3 :: 4 : 6
 \end{array} \right\} \text{Ans.}
 \end{array}$$

$$\begin{array}{l}
 (2) \quad \left. \begin{array}{l}
 ? : 3 :: 4 : 5; \therefore 5 : 4 :: 3 : 2\frac{2}{3} \\
 3 : ? :: 4 : 5; \therefore 4 : 5 :: 3 : 3\frac{3}{4} \\
 3 : 4 :: ? : 5; \therefore 4 : 3 :: 5 : 3\frac{3}{4} \\
 3 : 4 :: 5 : ?; \text{ or } 3 : 4 :: 5 : 6\frac{3}{4}
 \end{array} \right\} \text{Ans.}
 \end{array}$$

$$(3) \quad \text{Answers: } 3\frac{1}{3}, 4\frac{4}{5}, 4\frac{4}{5}, 7\frac{1}{3}.$$

$$(4) \quad \text{Answers: } 4\frac{2}{3}, 5\frac{5}{8}, 5\frac{5}{8}, 8\frac{2}{3}.$$

$$(5) \quad \text{Answers: } 1\frac{2}{3}, 2\frac{4}{5}, 2\frac{4}{5}, 17\frac{1}{3}.$$

$$(6) \quad \text{Answers: } 2\frac{1}{2}, 6\frac{2}{3}, 6\frac{2}{3}, 10.$$

$$(7) \quad \text{Answers: } 1\frac{5}{6}, 2\frac{4}{7}, 2\frac{4}{7}, 31\frac{1}{2}.$$

$$(8) \quad \text{Answers: } 5, 5, 5, 9\frac{4}{5}.$$

**Ex. 55.** (p.85.)

$$(1) \quad 12 : 8 :: £15 : \frac{£15 \times 8}{12} = £10. \quad \text{Ans.}$$

$$(2) \quad 16 : 72 :: 12 \text{ bu.} : \frac{12 \text{ bu.} \times 72}{16} = 54 \text{ bu.} \quad \text{Ans.}$$

$$(3) \quad 495 : 90 :: £396 : \frac{£396 \times 90}{495} = £72. \quad \text{Ans.}$$

$$(4) \quad 273 : 63 :: 182 \text{ ac.} : \frac{182 \text{ ac.} \times 63}{273} = 42 \text{ ac.} \quad \text{Ans.}$$

$$(5) \quad 180 : 100 :: 63 \text{ loads} : \frac{63 \text{ loads} \times 100}{180} = 35 \text{ loads.} \quad \text{Ans.}$$

$$(6) \quad 80 : 25 :: £176 : \frac{£176 \times 25}{80} = £55. \quad \text{Ans.}$$



- (7)  $63 : 18 :: 385 \text{ yds.} : \frac{385 \text{ yds.} \times 18}{63} = 55 \times 2 = 110 \text{ yds.}$  *Ans.*
- (8)  $85 : 205 :: 51 \text{ yds.} : \frac{51 \text{ yds.} \times 205}{85} = 3 \times 41 = 123 \text{ yds.}$  *Ans.*
- (9)  $36 \text{ ac. } 3 \text{ ro.} : 21 \text{ ac. } 3 \text{ ro. } 20 \text{ po.} :: £42;$   
 or,  $147 \text{ ro.} : 87\frac{1}{2} \text{ ro.} :: £42 : \frac{£21 \times 175}{147} = \frac{175}{7} = £25.$  *Ans.*
- (10)  $10 \text{ cwt. } 2 \text{ qrs. } 14 \text{ lbs.} : 4 \text{ cwt. } 1 \text{ qr. } 14 \text{ lbs.} :: £51;$   
 or,  $42\frac{1}{2} \text{ qrs.} : 17\frac{1}{2} \text{ qrs.} :: £51 : \frac{£51 \times 35}{85} = 3 \times 7 = £21.$  *Ans.*
- (11)  $£21 \text{ Os. } 9 \text{ d.} : £64 \text{ 7s.} :: 51 \text{ cwt.};$   
 or,  $420\frac{3}{4} \text{ s.} : 1287 \text{ s.} :: 51 \text{ cwt.} : \frac{51 \times 1287 \times 4}{1683} = 39 \times 4 = 156 \text{ cwt.}$  *Ans.*
- (12)  $172 \text{ cwt. } 2 \text{ qrs. } 18 \text{ lbs.} : 7 \text{ cwt. } 3 \text{ qrs. } 11 \text{ lbs.} :: £87 \text{ 6s. } 3 \text{ d.};$   
 or,  $19338 \text{ lbs.} : 879 \text{ lbs.} :: 1746\frac{1}{2} \text{ s.} : \frac{6985 \text{ s.} \times 879}{19338 \times 4} = 635 \text{ s.} \div 8$   
 $= £3 \text{ 19s. } 4\frac{1}{2} \text{ d.}$  *Ans.*

**Ex. 56.** (p. 89.)

- (1)  $18 \text{ ac.} : 42 \text{ ac.} :: £24 \text{ 18s. } 6 \text{ d.};$   
 or,  $3 : 7 :: £24 \text{ s. } 18 \text{ s. } 6 \text{ d.} : £8 \text{ 6s. } 2 \text{ d.} \times 7 = £58 \text{ 3s. } 2 \text{ d.}$  *Ans.*
- (2)  $365 \text{ da.} : 87 \text{ da.} :: £25 : \frac{£5 \times 87}{73} = £5 \text{ 19s. } 2\frac{10}{73} \text{ d.}$  *Ans.*
- (3)  $£1 \text{ 1s. } 8 \text{ d.} : £2 \text{ 18s. } 8 \text{ d.} :: 65 \text{ mi.};$   
 or  $21\frac{1}{3} \text{ s.} : 58\frac{2}{3} \text{ s.} :: 65 \text{ mi.} : \frac{65 \times 176}{65} = 176 \text{ mi.}$  *Ans.*
- (4)  $54 : 24 :: 2 \text{ hrs. } 46 \text{ min. } 30 \text{ sec.};$   
 or,  $9 : 4 :: 2 \text{ hrs. } 46\frac{1}{2} \text{ min.} : 11 \text{ hrs. } 6 \text{ min.} + 9 = 1 \text{ hr. } 14 \text{ min.}$  *Ans.*
- (5)  $£4 \text{ 13s. } 4 \text{ d.} : £70 \text{ 10s. } 6 \text{ d.} :: 5 \text{ ac.};$   
 or  $93\frac{1}{3} \text{ s.} : 1410\frac{1}{3} \text{ s.} :: 5 \text{ ac.} : \frac{5 \times 2821 \times 3}{280 \times 2}$   
 $= 1209 + 16 = 75 \text{ ac. } 2 \text{ ro. } 10 \text{ po.}$  *Ans.*
- (6)  $445 : 20 :: £14 \text{ 14s. } 9\frac{3}{4} \text{ d.};$   
 or,  $89 : 4 :: £14 \text{ 14s. } 9\frac{3}{4} \text{ d.} : 1179 \text{ s. } 3 \text{ d.} + 89 = 13 \text{ s. } 3 \text{ d.}$  *Ans.*
- (7)  $£25 : £10 \text{ 9s. } 4\frac{1}{2} \text{ d.} :: £2\frac{1}{2};$   
 or,  $£50 : £10 \text{ 9s. } 4\frac{1}{2} \text{ d.} :: £5 : £10 \text{ s. } 9 \text{ s. } 4\frac{1}{2} \text{ d.} + 10 = 20 \text{ s. } 11\frac{1}{2} \text{ d.}$  *Ans.*

- (8) £791 13s. 4d. : £95 10s. 9½d. :: £39 11s. 8d. ;  
 or, 15833½s. : £95 10s. 9½d. :: 791½s. :  $\frac{£95 \ 10s. \ 9\frac{1}{2}d. \times 2375}{47500}$   
 = £95 10s. 9½d. ÷ 20 = £4 15s. 6½d. *Ans.*
- (9) £2000 : £1 :: £110 7s. 6d. :  $\frac{2207s. \ 6d.}{2000} = 1s. \ 1\frac{49}{200}d. \quad Ans.$
- (10) 25 *quin.* : £65 10s. 6d. :: £4 11s. 10½d. ;  
 or, 525s. : £65 10s. 6d. :: 91½s. :  $\frac{£65 \ 10s. \ 6d. \times 735}{4200}$   
 = £65 10s. 6d. × 7 ÷ 40 = £11 9s. 4½d. *Ans.*

**Ex. 57.** (p. 91.)

- (1) 8 : 12 :: 100 m. : 100 m. × 3 ÷ 2 = 150 m. *Ans.*
- (2) 12 : 18 :: 4 mo. : 18 mo. ÷ 3 = 6 mo. *Ans.*
- (3) 200 : 300 :: 8 mo. : 4 mo. × 3 = 12 mo. *Ans.*
- (4) 168 : 266 :: 108 m. : 9 m. × 19 = 171 m. *Ans.*
- (5) 9 : 12 :: 3 wks. : 12 wks. ÷ 3 = 4 wks. *Ans.*
- (6) 70 : 47½ :: 12d. : 3d. × 189 ÷ 70 = 3d. ×  $\frac{27}{10} = 8\frac{1}{10}d. \quad Ans.$
- (7) 27 : 35 :: 480 ac. :  $\frac{160 \times 35}{9} = 622\frac{2}{9} \text{ ac.} \quad Ans.$
- (8) 5 : 3 :: 14 oz. : 8½ oz. *Ans.*

**Ex. 58.** (p. 92.)

- (1) 71 : 15 :: 36s. 11½d. — 6656½d. ÷ 71 = 7s. 9¾d. *Ans.*
- (2) 311 : 20 :: £585 1s. 4½d. : 234027½s. ÷ 311 = 752½s. = £37 12s. 6d. *Ans.*
- (3) £4726½ : £1 :: £1181½  
 or 37812 : 20s. :: 9453 : 20s. ÷ 4 = 5s. *Ans.*
- (4) 3½ : 4½ :: £27 10s. :  $£\frac{55}{2} \times \frac{37}{8} \times \frac{4}{15} = \frac{£407}{12} = £33 \ 18s. \ 4d. \quad Ans.$

- (5) 39 cwt. 1 qr. 11 lbs. : 13 cwt. :: £59 6s. 6d.  
 or 3 cwt. 3 lbs. : 1 cwt. :: £59 6s. 6d.  
 or 339 lbs. : 112 lbs. ::  $1186\frac{1}{2}s. : \frac{2373s. \times 56}{339}$   
 $= 7s. \times 56 = £19\ 12s.$  *Ans.*
- (6) £27 14s. 8d. : £374 8s. ::  $6\frac{1}{2}$  cwt.  
 or  $554\frac{2}{3}s. : 3744s. :: 13\ cwt. : \frac{13 \times 3744 \times 3}{1664}$   
 $= 117 \times 3 + 4 = 87\frac{3}{4}$  cwt. *Ans.*
- (7) £335 $\frac{3}{8}$  : £1 :: £58 13s. 9 $\frac{3}{4}$ d.  
 or 2683 : 1 :: 9390s. 6d. : 3s. 6d. *Ans.*
- (8) £31 16s. 4d. : £117 11s. 8d. :: 46 gals.  
 or  $636\frac{1}{3}s. : 2351\frac{2}{3}s. :: 46\ gals. : \frac{46 \times 7055}{1909}$   
 $= 14110 + 83 = 170$  gals. *Ans.*
- (9) £8 18s. 9d. : £5 12s. 6d. :: 17 cwt. 3 $\frac{1}{2}$  qrs.  
 or  $178\frac{3}{4}s. : 112\frac{1}{2}s. :: 17\frac{7}{8}$  cwt.  
 or  $1430 \times 2 : 225 :: 143\ cwt. : 225 \div 20 = 11\frac{1}{4}$  cwt. *Ans.*
- (10) 6s. 9d. : 6s. :: 3 lbs.  
 or 27 : 24 :: 3 lbs. : 24 lbs. + 9 = 2 lbs. 10 $\frac{3}{4}$  oz. *Ans.*
- (11) 11 : 12000000 ::  $\frac{25}{113}$  of £8 $\frac{3}{4}$   
 or 11 : 300000 :: £43  $\times \frac{25}{14} : \frac{£43 \times 7500000}{14 \times 11}$   
 $= £2094155\ 16s. 10\frac{4}{7}d.$  *Ans.*
- (12) Rem. 1 ton 8 cwt. 27 lbs. 4 oz. = 3163 $\frac{1}{4}$  lbs.  
 55 lbs. : 3163 $\frac{1}{4}$  lbs. :: £1 $\frac{3}{4}$   
 or  $220 \times 8 : 12653 :: £11 : £12653 \div 160$   
 $= £79\ 1s. 7\frac{1}{2}d.$  *Ans.*
- (13) Each £100 of gross income is reduced to £88 15s. nett;  
 100 : 8050 :: £88 $\frac{3}{4}$   
 or  $2 \times 4 : 161 :: £355 : £7144\ 7s. 6d.$  *Ans.*
- (14)  $4\frac{1}{4} : 20 :: £5\ 14s. 4\frac{1}{2}d.$   
 or  $17 : 20 :: £22\ 17s. 6d. : £26\ 18s. 2\frac{1}{4}d.$  *Ans.*
- (15)  $1\frac{2}{3} : 24\frac{1}{2} :: 2s. 6d.$   
 or  $5 \times 2 : 49 \times 3 :: £\frac{1}{8} : \frac{£49 \times 3}{8 \times 10} - £1\ 16s. 9d.$  *Ans.*

- (16)  $1\frac{3}{8}$  cwt. :  $17\frac{3}{4}$  lbs. :: £7 7s.  
or  $11 \times 112$  lbs. : 142 lbs. :: 147s. :  $\frac{21s. \times 71}{11 \times 8} = 16s. 11\frac{7}{32}d.$  *Ans.*
- (17)  $100 : 2456 :: 22$  yds. : 540.32 yds. *Ans.*
- (18)  $1250 : 525 :: £27$  10s. 6d.  
or  $50 : 21 :: £27$  10s. 6d. : £11 11s.  $2\frac{13}{32}d.$  *Ans.*
- (19)  $14$  lbs.  $3\frac{3}{8}$  oz. : 1 oz. :: £514  $\frac{1}{8}$   
or  $71$  lbs. 5 oz. : 1 oz. :: £2571 : £2571 + 857 = £3. *Ans.*
- (20)  $4\frac{3}{8} : 14\frac{3}{8} :: 3s. 4\frac{1}{2}d.$   
or  $23 \times 8 : 115 \times 5 :: 3s. 4\frac{1}{2}d. : 3s. 4\frac{1}{2}d. \times 3\frac{1}{8} = 10s. 6\frac{9}{16}d.$  *Ans.*
- (21)  $2\frac{1}{4} : 13\frac{5}{8} :: 3\frac{3}{4}s.$   
or  $9 \times 8 : 109 :: 15s. : 545s. \div 24 = 22s. 8\frac{1}{2}d.$  *Ans.*
- (22) £3225 : 20s. :: £1020 :  $\frac{68s. \times 4}{43} = 6s. 3\frac{39}{43}d.$  *Ans.*
- (23)  $6\frac{3}{8} : 4\frac{3}{8} :: 27s. 9\frac{1}{2}d.$   
or  $20 \times 8 : 35 \times 3 :: 333\frac{1}{2}d. : \frac{667d. \times 7 \times 3}{2 \times 4 \times 8}$   
 $218\frac{55}{64}d. = 18s. 2\frac{55}{34}d.$  *Ans.*
- (24)  $\frac{5}{8} : \frac{3}{7}$  of  $\frac{3}{4} :: £525 : \frac{525 \times 9 \times 8}{7 \times 4 \times 5} = £30 \times 9 = £270.$  *Ans.*
- (25)  $13\frac{1}{2}s. : £980 :: 20s. : \frac{£980 \times 40}{27} = £1451$  17s.  $0\frac{4}{9}d.$  *Ans.*
- (26)  $7d. : £13\frac{1}{8} :: 240d.$   
or  $7d. : £105 :: 30d. : £15 \times 30 = £450.$  *Ans.*
- (27) £210 6s. : £175 5s. :: 102 da.  
or  $4206 : 3505 :: 102 : 17 \times 5 = 85$  da. *Ans.*
- (28)  $2\frac{2}{3} : 3\frac{1}{4} :: 6336$  st.  
or  $8 : 13 \times 3 :: 1584$  st. :  $198 \times 39 = 7722$  st. *Ans.*
- (29)  $5\frac{1}{4} : 148\frac{1}{8} :: 6\frac{1}{8}$  ft. :  $\frac{19}{3} \times \frac{445}{3} \times \frac{4}{21}$   
 $= 33820$  ft. + 189 = 178 ft.  $11\frac{19}{33}$  in. *Ans.*
- (30)  $3\frac{3}{8}$  sec. : 1 sec. ::  $115\frac{1}{8}$  ft.  
or  $18 : 1 :: 576$  ft. : 32 ft. at end of 1st sec. *Ans.*  
∴  $32$  ft.  $\times 4\frac{3}{4} = 152$  ft. at end of  $4\frac{3}{4}$  sec. *Ans.*

$$(31) \quad 32 : 9 :: 24 \text{ hrs.} : 3 \text{ hrs.} \times 9 + 4 = 6\frac{3}{4} \text{ hrs.} \quad \text{Ans.}$$

$$(32) \quad \begin{array}{l} 7 \text{ wks.} : 3 \text{ wks.} :: 22400 \text{ pers.} : 9600 \text{ pers.} \\ \text{i.e. for 7 wks. only } \underline{9600 \text{ pers.}} \text{ can be maintained;} \\ \therefore \underline{12800 \text{ pers.}} \text{ sent away.} \quad \text{Ans.} \end{array}$$

(Otherwise):

7 wks. : 4 wks. :: 22400 pers. : 12800 pers. *Ans.*  
 i.e. since 22400 pers. would require 4 wks. provision beyond what is supplied, therefore 12800 would require such extra provision for the 7 wks.

$$(33) \quad \begin{array}{l} £3\frac{1}{2} : 12 \text{ guin.} :: 20 \text{ wks.} \\ \text{or } 3\frac{1}{2} \times 20 : 12 \times 21 :: 20 \text{ wks.} : \frac{24 \times 21}{7} = 72 \text{ wks.} \quad \text{Ans.} \end{array}$$

$$(34) \quad 3\frac{1}{4} : 15\frac{1}{2} :: 60 \text{ mi.} : \frac{60 \times 31 \times 4}{2 \times 13} = 286\frac{2}{13} \text{ mi.} \quad \text{Ans.}$$

$$(35) \quad \begin{array}{l} \text{Lays by } £52\frac{1}{2}; \text{ therefore spends } £450 - £52\frac{1}{2}. \\ 365 \text{ da.} : 73 \text{ da.} :: £397\frac{1}{2} : 397\frac{1}{2} + 5 = £79 \text{ 10s.} \quad \text{Ans.} \end{array}$$

$$(36) \quad \begin{array}{l} 13\frac{3}{5} \text{ tons} : 3 \text{ cwt. 1 lb. } 1\frac{1}{2} \text{ oz.} :: £525 \\ \text{or } 13\frac{3}{5} \times 2240 \times 16 \text{ oz.} : 5393\frac{1}{2} \text{ oz.} :: £525 \\ \text{or } 67 \times 64 \times 32 : 10787 :: £75 : \frac{75 \times 161}{64 \times 32} \\ = £5 \text{ 17s. 11}\frac{5}{128} \text{d.} \quad \text{Ans.} \end{array}$$

$$(37) \quad \begin{array}{l} 23\frac{1}{2} \text{ cwt.} : 71\frac{1}{4} \text{ cwt.} :: £2 \text{ 14s.} \\ \text{or } 94 : 285 :: 54s. : £8 \text{ 3s. } 8\frac{32}{47} \text{d.} \quad \text{Ans.} \end{array}$$

$$(38) \quad \begin{array}{l} 4\frac{5}{9} \text{ oz.} : 8\frac{13}{24} \text{ lbs.} :: 8\frac{31}{32} \text{ s.} : \frac{287}{32} \times \frac{205 \times 16}{24} \times \frac{9}{41} \\ = \frac{287 \text{ s.} \times 5 \times 3}{8 \times 2} = £13 \text{ 9s. } 0\frac{3}{4} \text{d.} \quad \text{Ans.} \end{array}$$

$$(39) \quad \begin{array}{l} 1\frac{3}{50} \text{d.} : 79\frac{1}{2} \text{d.} :: 40 \text{ lbs.} \times 2\frac{1}{2} \times \frac{2}{3} \times \frac{1}{192} \\ : \frac{100 \times 2}{3 \times 192} \times \frac{159}{2} \times \frac{50}{53} = \frac{100}{192} \times 50 = 26\frac{1}{24} \text{ lbs.} \quad \text{Ans.} \end{array}$$

$$(40) \quad \begin{array}{l} £9000 : £1 :: £3515\frac{5}{8} \\ \text{or } 72000 : 1 :: £28125 : £\frac{25}{64} = 7s. \text{ } 9\frac{3}{4} \text{d.} \quad \text{Ans.} \\ 1 - \frac{25}{64} = \frac{39}{64} \text{ of } £750 = £457 \text{ 0s. } 7\frac{1}{2} \text{d.} \quad \text{Ans.} \end{array}$$

**Ex. 59.** (p. 97.)

- (1)  $\left. \begin{array}{l} 15 : 20 \text{ pks.} \\ 6 : 9 \text{ pers.} \end{array} \right\} :: 22 \text{ da.} : \frac{22 \text{ da.} \times 20 \times 9}{15 \times 6} = 22 \times 2 = 44 \text{ da.} \text{ Ans.}$
- (2)  $\left. \begin{array}{l} 312 : 702s. \\ 24 : 18 \text{ da.} \end{array} \right\} :: 16 \text{ m.} : \frac{16 \text{ m.} \times 702 \times 18}{312 \times 24} = 9 \times 3 = 27 \text{ m.} \text{ Ans.}$
- (3)  $\left. \begin{array}{l} 1 : 3 \text{ times the work} \\ \frac{1}{5} \text{ of the time} : 1 \text{ time} \end{array} \right\} :: 20 \text{ m.} : 20 \times 3 \times 5 = 300 \text{ m.} \text{ Ans.}$
- (4)  $\left. \begin{array}{l} 7 : 20 \text{ da.} \\ £14 : £28 \end{array} \right\} :: 7 \text{ horses} : \frac{7 \text{ h.} \times 20 \times 28}{7 \times 14} = 40 \text{ h.} \text{ Ans.}$
- (5)  $\left. \begin{array}{l} £160 : £853\frac{1}{3} \\ 8 : 4 \text{ mo.} \end{array} \right\} :: 12 \text{ pers.} : \frac{10240 \times 4}{160 \times 8} = 32 \text{ pers.} \text{ Ans.}$
- (6)  $\left. \begin{array}{l} 56 : 120 \text{ bu.} \\ 24 : 16 \text{ da.} \end{array} \right\} :: 14 \text{ horses} : \frac{14 \times 120 \times 16}{56 \times 24} = 20 \text{ h.} \text{ Ans.}$
- (7)  $\left. \begin{array}{l} 3 : 5 \text{ thous.} \\ 11 : 12\frac{1}{2} \text{ sh.} \end{array} \right\} :: 66 \text{ rms.} : \frac{33 \times 5 \times 25}{3 \times 11} = 125 \text{ rms.} \text{ Ans.}$
- (8)  $\left. \begin{array}{l} 8 : 32 \text{ m.} \\ 5 : 24 \text{ da.} \end{array} \right\} :: £9 : \frac{£9 \times 32 \times 24}{8 \times 5} = £172 \text{ 16s.} \text{ Ans.}$
- (9)  $\left. \begin{array}{l} £100 : £150 \\ 12 : 5 \text{ pers.} \end{array} \right\} :: 22\frac{2}{7} \text{ wks.} : \frac{160 \times 150 \times 5}{7 \times 100 \times 12} = 14\frac{2}{7} \text{ wks.} \text{ Ans.}$
- (10)  $\left. \begin{array}{l} 7 : 28 \text{ m.} \\ 10\frac{1}{2} : 31\frac{1}{2} \text{ da.} \end{array} \right\} :: 190\frac{1}{2}s. : \frac{381s. \times 14 \times 63}{7 \times 21} = £114 \text{ 6s.} \text{ Ans.}$
- (11)  $\left. \begin{array}{l} £76\frac{2}{3} : £103\frac{1}{3} \\ 24 : 16 \text{ da.} \\ \frac{1}{3} : 1 \text{ rate} \end{array} \right\} :: 25 \text{ m.} : \frac{25 \times 207 \times 16 \times 3}{230 \times 24} = 45 \text{ m.} \text{ Ans.}$
- (12)  $\left. \begin{array}{l} 72 \times 4 : 1843\frac{1}{5} \text{ ro.} \\ 6 : 5 \text{ da.} \end{array} \right\} :: 21 \text{ m.} : \frac{21 \times 9216}{72 \times 4 \times 6} = 112 \text{ m.} \text{ Ans.}$
- (13)  $\left. \begin{array}{l} 9 : 24 \text{ pers.} \\ 8 : 16 \text{ mo.} \end{array} \right\} :: £120 : \frac{£120 \times 24 \times 2}{9} = £640. \text{ Ans.}$
- (14)  $\left. \begin{array}{l} 11 : 33 \text{ ac.} \\ 18 : 5 \text{ da.} \end{array} \right\} :: 12 \text{ horses} : \frac{12 \times 3 \times 5}{18} = 10 \text{ horses.} \text{ Ans.}$
- (15)  $\left. \begin{array}{l} 8 : 6d. \\ 32\frac{2}{5} : 48 \text{ oz.} \end{array} \right\} :: 54s. : \frac{54 \times 6 \times 48 \times 5}{8 \times 162} = 60s. \text{ Ans.}$

- (16)  $\left. \begin{array}{l} 90 : 540 \text{ mi.} \\ 6 : 8 \text{ hrs.} \end{array} \right\} :: 3 \text{ da.} : \frac{3 \times 6 \times 8}{6} = 24 \text{ da.} \text{ Ans.}$
- (17)  $\left. \begin{array}{l} 5 : 16 \text{ m.} \\ 12 : 20 \text{ mo.} \end{array} \right\} :: £18\frac{3}{4} : \frac{£75 \times 4 \times 20}{5 \times 12} = £100. \text{ Ans.}$
- (18)  $\left. \begin{array}{l} 14 : 3 \text{ pers.} \\ £7 : £112 \end{array} \right\} :: 4 \text{ wks.} : \frac{4 \times 3 \times 16}{14} = 13\frac{1}{7} \text{ wks.} \text{ Ans.}$
- (19)  $\left. \begin{array}{l} 80 : 30 \text{ cwt.} \\ 108\frac{3}{4} : 29 \times 20\text{s.} \end{array} \right\} :: 15 \text{ mi.} : \frac{15 \times 30 \times 29 \times 20}{20 \times 435} = 30 \text{ mi.} \text{ Ans.}$
- (20)  $\left. \begin{array}{l} 34 : 95\frac{1}{2} \text{ ac.} \\ 6 : 5 \text{ da.} \end{array} \right\} :: 6 \text{ m.} : \frac{6 \times 476}{34 \times 6} = 14 \text{ m.} \text{ Ans.}$
- (21)  $\left. \begin{array}{l} 40 : 195 \text{ bu.} \\ 9 : 12 \text{ h.} \end{array} \right\} :: 37 \text{ da.} : \frac{37 \times 195 \times 12}{40 \times 9} = 240\frac{1}{2} \text{ da.} \text{ Ans.}$
- (22)  $\left. \begin{array}{l} 16 : 100 \text{ mi.} \\ 15 : 11 \text{ hrs.} \end{array} \right\} :: 3 \text{ da.} : \frac{3 \times 100 \times 11}{16 \times 15} = 13\frac{3}{4} \text{ da.} \text{ Ans.}$
- (23)  $\left. \begin{array}{l} 5 : 8 \text{ m.} \\ 8 : 20 \text{ ac.} \end{array} \right\} :: 2 \text{ da.} : \frac{2 \times 3 \times 20}{5 \times 8} = 3 \text{ da.} \text{ Ans.}$
- (24)  $\left. \begin{array}{l} 25 : 40 \text{ sh.} \\ 14 : 60 \text{ da.} \end{array} \right\} :: 1 \text{ ton} : \frac{40 \times 60}{25 \times 14} = 6 \text{ tons } 17 \text{ cwt. } 16 \text{ lbs.} \text{ Ans.}$
- (25)  $\left. \begin{array}{l} 30 : 60 \text{ yds.} \\ 64 : 24 \text{ da.} \\ 6 : 8 \text{ hrs.} \end{array} \right\} :: 18 \text{ m.} : \frac{18 \times 2 \times 24 \times 8}{64 \times 6} = 18 \text{ m.} \text{ Ans.}$
- (26)  $\left. \begin{array}{l} 18 : 12 \text{ m.} \\ 24 : 72 \text{ r.} \\ 40 : 30 \text{ da.} \end{array} \right\} :: 8 \text{ hrs.} : \frac{8 \times 12 \times 3 \times 3}{18 \times 4} = 12 \text{ hrs.} \text{ Ans.}$
- (27)  $\left. \begin{array}{l} 7 : 20 \text{ m.} \\ 12 : 11 \text{ da.} \\ 8\frac{1}{4} : 7\frac{1}{2} \text{ hrs.} \end{array} \right\} :: 84 \text{ ac.} : \frac{84 \times 4 \times 11 \times 39}{7 \times 3 \times 33} = 208 \text{ ac.} \text{ Ans.}$
- (28)  $\left. \begin{array}{l} 100 : 80 \text{ ft.} \\ 3 : 5 \text{ ft.} \\ 4\frac{1}{2} : 2 \text{ ft.} \\ 5\frac{1}{2} : 9 \text{ da.} \end{array} \right\} :: 8 \text{ m.} : \frac{8 \times 80 \times 10 \times 9}{50 \times 9 \times 16} = 8 \text{ m.} \text{ Ans.}$
- (29)  $\left. \begin{array}{l} 3 : 7 \text{ m.} \\ 1 : 2\frac{3}{4} \text{ work} \\ 12 : 9\frac{3}{4} \text{ hrs.} \end{array} \right\} :: 20\frac{5}{8} \text{ da.} : \frac{165 \times 7 \times 11 \times 48}{8 \times 4 \times 5 \times 3 \times 12} = 105\frac{7}{8} \text{ da.} \text{ Ans.}$
- (30)  $\left. \begin{array}{l} 6 : 15 \text{ bars} \\ 4 : 6\frac{1}{2} \text{ ft.} \\ 3 : 4 \text{ in.} \\ 2 : 3 \text{ in.} \end{array} \right\} :: 288 \text{ lbs.} : \frac{144 \times 15 \times 13 \times 3}{6 \times 3 \times 2} = 2340 \text{ lbs.} \\ = 1 \text{ ton } 3 \text{ qrs. } 16 \text{ lbs.} \text{ Ans.}$

**Ex. 60.** (p. 100.)

- (1)  $£500 \times \frac{5 \times 5}{100} = £5 \times 25 = £125.$  *Ans.*
- (2)  $£375 \times \frac{3 \times 4}{100} = £4500 \div 100 = £45.$  *Ans.*
- (3)  $£1125 \times \frac{4 \times 3}{100} = £13500 \div 100 = £135, \text{ int.};$   
 $\therefore \text{Amt.} = £1125 + 135 = £1260.$  *Ans.*  
*Otherwise:*  $100 : 1125 :: £112 : £1260.$  *Ans.*
- (4)  $£2275 \times \frac{3\frac{1}{2} \times 5}{100} = £2275 \times \frac{7}{40} = £398 \text{ 2s. 6d., int.};$   
 $\therefore \text{Amt.} = £2673 \text{ 2s. 6d.}$  *Ans.*  
*Otherwise:*  $100 : 2275 :: £117\frac{1}{2} : £2673 \text{ 2s. 6d.}$  *Ans.*
- (5)  $£1245 \times \frac{4\frac{3}{4} \times 15}{100} = £1245 \times \frac{57}{80} = £887 \text{ 1s. 3d.}$  *Ans.*
- (6)  $£2000 \times \frac{12\frac{1}{4} \times 3\frac{1}{2}}{100} = £20 \times 12\frac{1}{4} \times 3\frac{1}{2} = £857 \text{ 10s., int.};$   
 $\therefore \text{Amt.} = £2857 \text{ 10s.}$  *Ans.*  
*Otherwise:*  $£100 : £2000 :: £142\frac{7}{8} : £2857 \text{ 10s.}$  *Ans.*
- (7)  $£575 \times \frac{8\frac{3}{4} \times 8\frac{3}{8}}{100} = £575 \times \frac{189}{640} = £169 \text{ 16s. } 1\frac{1}{8}\text{d., int.};$   
 $\therefore \text{Amt.} = £744 \text{ 16s. } 1\frac{1}{8}\text{d.}$  *Ans.*  
*Otherwise:*  $£100 : £575 :: £129\frac{17}{32} : £744 \text{ 16s. } 1\frac{1}{8}\text{d.}$  *Ans.*
- (8)  $£325 \cdot 5 \times \frac{5\frac{1}{2} \times 4}{100} = £3 \cdot 255 \times 22 = £71 \text{ 12s. } 2\frac{1}{2}\text{d.}$  *Ans.*
- (9)  $£500\frac{2}{3} \times \frac{2\frac{3}{4} \times 2\frac{3}{4}}{100} = \frac{1502 \times 11 \times 11}{3 \times 1600} = £37 \text{ 17s. } 3\frac{1}{10}\text{d.}$  *Ans.*
- (10)  $£150 \times \frac{4}{100} \times 3\frac{5}{12} = £6 \times 3\frac{5}{12} = £20\frac{1}{2} = £20 \text{ 10s.}$  *Ans.*
-



**Ex. 61.** (p. 102.)

- (1) From March 1 to Jan. 10 are 315 da. =  $\frac{63}{73}$  of a yr.

$$£500 \times \frac{4\frac{5}{8}}{100} \times \frac{63}{73} = £5 \times \frac{37}{8} \times \frac{63}{73} = £19\ 19s. 1\frac{53}{73}d.$$

$$\therefore \text{Amt.} = £519\ 19s. 1\frac{53}{73}d. \text{ Ans.}$$

- (2) From May 5 to Oct. 27 are 175 da. =  $\frac{35}{73}$  of a yr.

$$£7500 \times \frac{3\frac{1}{8}}{100} \times \frac{35}{73} = £75 \times \frac{25}{8} \times \frac{35}{73} = £112\ 7s. 5\frac{13}{73}d.$$

$$\therefore \text{Amt.} = £7612\ 7s. 5\frac{13}{73}d. \text{ Ans.}$$

- (3) 1 yr. 115 da. =  $1\frac{23}{73}$  yr. =  $\frac{96}{73}$  yr.

$$£1158\frac{7}{8} \times \frac{2\frac{1}{2}}{100} \times \frac{96}{73} = £9271 \times \frac{1}{40} \times \frac{12}{73} = £38\ 2s., \text{ int.};$$

$$\therefore \text{Amt.} = £1196\ 19s. 6d. \text{ Ans.}$$

- (4) From March 26, 1840, to Oct. 31, 1842, are 2 yrs. 219 days. =  $2\frac{3}{8}$  yrs.

$$£250\frac{5}{8} \times \frac{3}{100} \times 2\frac{3}{8} = \frac{401 \times 39}{800} = £19\ 10s. 11\frac{7}{10}d. \text{ Ans.}$$

- (5)  $£3996\frac{3}{4} \times \frac{2\frac{2}{3}}{100} \times \frac{4\frac{45}{73}}{73} = \frac{15987}{4} \times \frac{337}{73} \times \frac{4}{150} = \frac{73 \times 337}{50}$   
 $= £492\ 0s. 4\frac{1}{2}d. \text{ Ans.}$

- (6)  $£2755\frac{3}{4} \times \frac{3\frac{1}{8}}{100} \times \frac{32\frac{2}{3}}{73} = \frac{11023}{4} \times \frac{1}{32} \times \frac{241}{73} = \frac{151 \times 241}{4 \times 32}$   
 $= £284\ 6s. 1\frac{1}{8}d. \text{ Ans.}$

**Ex. 62.** (p. 102.)

- (1)  $£95\ 16s. 8d.$

$$2\frac{1}{2} = \frac{1}{40} = \frac{2\ 7\ 11}{98\ 4\ 7}$$

$$\frac{1}{40} = \frac{2\ 9\ 1\frac{3}{8}}{98\ 4\ 7}$$

$$\text{Ans. } \underline{\underline{£100\ 13s. 8\frac{3}{8}d.}}$$

(Otherwise):

$$\text{Amt. of 100 for 1 yr.} = 102\frac{1}{2};$$

$$\text{Do. of 1 for 1 yr.} = 1.025;$$

$$\text{Do. of 1 for 2 yrs.} = 1.025^2 =$$

$$1.050625, \text{ which } \times 95\frac{4}{8} = \text{Ans.}$$

$$\begin{array}{r}
 (2) \quad \text{£50 } 0\text{s. } 0\text{d.} \\
 5 = \frac{1}{20} = \begin{array}{r} 2 \ 10 \ 0 \\ \hline 52 \ 10 \ 0 \\ 2 \ 12 \ 6 \\ \hline 55 \ 2 \ 6 \\ 2 \ 15 \ 1\frac{1}{2} \\ \hline \text{Ans. } \text{£57 } 17\text{s. } 7\frac{1}{2}\text{d.} \end{array}
 \end{array}$$

$$\begin{array}{l}
 (\text{Otherwise}): \\
 1.05^5 \times 50 = \\
 1.157625 \times 50 = \\
 \text{£57.88125. } \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 (3) \quad \text{£41 } 13\text{s. } 4\text{d.} \\
 5 = \frac{1}{20} = \begin{array}{r} 2 \ 1 \ 8 \\ \hline 43 \ 15 \ 0 \\ 2 \ 3 \ 9 \\ \hline \text{Amt. } \text{£45 } 18 \ 9 \\ 41 \ 13 \ 4 \\ \hline \text{Comp. int. } \text{£4 } 5\text{s. } 5\text{d.} \end{array}
 \end{array}$$

$$\begin{array}{l}
 \text{£41 } 13\text{s. } 4\text{d.} \times \frac{5 \times 2}{100} \\
 = \text{£41 } 13\text{s. } 4\text{d.} \div 10 \\
 = \text{£4 } 3\text{s. } 4\text{d. simp. int.} \\
 4 \ 5 \ 5 \text{ comp. int.} \\
 \text{Diff.} = \text{£0 } 2\text{s. } 1\text{d. } \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 (4) \quad \text{£365 } 4\text{s. } 8\frac{1}{4}\text{d.} \\
 4 = \frac{1}{25} = \begin{array}{r} 14 \ 12 \ 2\frac{1}{4} \\ \hline 379 \ 16 \ 10\frac{1}{2} \\ 15 \ 3 \ 10\frac{1}{2} \\ \hline 395 \ 0 \ 9 \\ 15 \ 16 \ 0.36 \\ \hline \text{£410 } 16 \ 9.36 \end{array}
 \end{array}$$

$$\begin{array}{l}
 \text{£365 } 4\text{s. } 8\frac{1}{4}\text{d.} \times \frac{3 \times 4}{100} \\
 \frac{4382 \ 16 \ 3}{12} \div 100 \\
 = 43 \ 16 \ 6\frac{3}{4} \text{ simp. int.} \\
 \text{£409 } 1 \ 3 \text{ amt. by simp. int.} \\
 410 \ 16 \ 9.36 \text{ amt. by comp. int.} \\
 \text{£1 } 15\text{s. } 6.36\text{d. } \text{Ans.}
 \end{array}$$

$$\begin{array}{r}
 (5) \quad \text{£225} \times \frac{3\frac{3}{4}}{100} \text{ or } \frac{3}{80} \\
 80 \overline{)675} \\
 \begin{array}{r} 8 \ 8 \ 9 \\ 233 \ 8 \ 9 \\ 3 \end{array} \\
 80 \overline{)700 \ 6 \ 3} \\
 \begin{array}{r} 8 \ 15 \ 0\frac{5}{8} \\ 242 \ 3 \ 9\frac{5}{8} \\ 3 \end{array} \\
 80 \overline{)726 \ 11 \ 5\frac{5}{8}} \\
 \begin{array}{r} 9 \ 1 \ 7\frac{85}{256} \\ \text{Amt. } 251 \ 5 \ 5\frac{169}{256} \\ \text{Int. } \text{£26 } 5\text{s. } 5\frac{169}{256}\text{d. } \text{Ans.} \end{array}
 \end{array}$$

$$\begin{array}{r}
 (6) \quad \text{£300} \times \frac{2\frac{2}{3}}{100} \text{ or } \frac{8}{300} \\
 300 \overline{)2400} \\
 \begin{array}{r} 8 \\ 308 \\ 8 \end{array} \\
 300 \overline{)2464} \\
 \begin{array}{r} 8 \ 4 \ 3\frac{1}{3} \\ 316 \ 4 \ 3\frac{1}{3} \\ 8 \end{array} \\
 300 \overline{)2529 \ 14 \ 1\frac{2}{3}} \\
 \begin{array}{r} 8 \ 8 \ 7\frac{287}{375} \\ \text{Amt. } 324 \ 12 \ 10\frac{282}{375} \\ \text{Int. } \text{£24 } 12\text{s. } 10\frac{282}{375}\text{d. } \text{Ans.} \end{array}
 \end{array}$$

**Ex. 63.** (p. 104.)

- (1)  $\left. \begin{array}{l} 102\frac{1}{2} : 100 \\ 2\frac{1}{4} : 1 \text{ yr.} \end{array} \right\} :: £12 \ 13s. \ 8\frac{1}{2}d. : \frac{£101 \ 9s. \ 6d. \times 100}{205 \times 9}$   
 $= 40590s. \div (41 \times 9) = £5\frac{1}{2}. \text{ Ans.}$
- (2) Amt. of £100 for 1 yr. =  $100 + 6\frac{1}{2} = £106\frac{1}{2}$ .  
 $106\frac{1}{2} : £45 \ 0s. \ 9\frac{3}{4}d. :: 100 : £42 \ 5s. \ 10d. \text{ Ans.}$
- (3)  $\left. \begin{array}{l} £498 \ 16s. \ 8d. : £100 \\ £6\frac{1}{8} : £10 \ 9s. \ 3\frac{1}{2}d. \end{array} \right\} :: 1 \text{ yr.} : \frac{£83 \ 14s. \ 2d. \times 100}{£498 \ 16s. \ 8d. \times 49}$   
 $= \frac{10045 \times 100}{59860 \times 49} = \frac{25}{73} \text{ of a yr.} = 125 \text{ da.} \text{ Ans.}$
- (4)  $\left. \begin{array}{l} 200 : 100 \\ 146 : 365 \text{ da.} \end{array} \right\} :: 4\frac{4}{5} : \frac{24 \times 73}{2 \times 146} = 6 \text{ p. c.} \text{ Ans.}$
- (5) Int. on £732 11s. 10d. = £976 15s. 9 $\frac{1}{8}$ d.  
 $\left. \begin{array}{l} £732 \ 11s. \ 10d. : £100 \\ £5\frac{1}{2} : £976 \ 15s. \ 9\frac{1}{8}d. \end{array} \right\} :: 1 \text{ yr.} : \frac{£2930 \ 7s. \ 4d. \times 100}{£732 \ 11s. \ 10d. \times 16}$   
 $= 4 \times 100 + 16 = 25 \text{ yrs.} \text{ Ans.}$
- (6) Int. on 100 at  $4\frac{2}{3}$  p. c. for  $5\frac{1}{2}$  yrs. =  $\frac{14}{3} \times \frac{21}{4} = 24\frac{1}{2}$ ;  
 $124\frac{1}{2} : £49 \ 0s. \ 5\frac{1}{2}d. :: 100 : £39 \ 7s. \ 6d. \text{ Ans.}$
- (7)  $£4127\frac{1}{2} : £100 :: £92 \ 17\frac{3}{8}s. : 18573 \cdot 75 + 8255 = 2\frac{1}{2} \text{ p. c.} \text{ Ans.}$
- (8)  $\left. \begin{array}{l} £5\frac{3}{8} : £121 \ 15\frac{5}{12}s. \\ 2\frac{1}{12} : 1 \text{ yr.} \end{array} \right\} :: 100 : \frac{£1461\frac{1}{2} \times 100}{28 \times 5} = £1043 \ 15s. \text{ Ans.}$
- (9)  $\left. \begin{array}{l} 419 : 100 \\ £4 \ 7s. \ 6d. : £67 \ 4s. \ 3\frac{1}{2}d. \end{array} \right\} :: 1 \text{ yr.} : \frac{16131\frac{1}{2} \times 100}{419 \times 1050} = \frac{11}{3} = 3\frac{2}{3} \text{ yrs.}$   
Ans.
- (10)  $\left. \begin{array}{l} £220 \ 12s. \ 6d. : £100 \\ 3\frac{2}{3} : 1 \text{ yr.} \end{array} \right\} :: £19 \ 12s. \ 2\frac{2}{3}d. : \frac{£58 \ 16s. \ 8d. \times 10}{£220 \ 12s. \ 6d.}$   
 $= 588\frac{1}{3} + 220\frac{5}{8} = \frac{8}{3} = 2\frac{2}{3} \text{ p. c.} \text{ Ans.}$
- (11) Int. on 100 for  $3\frac{1}{2}$  yrs. =  $6\frac{1}{2} \times 3\frac{1}{2} = 20$ ;  
 $120 : £10 \ 1s. \ 10\frac{1}{2}d. :: 100 : £8 \ 8s. \ 2\frac{3}{4}d. \text{ Ans.}$
- (12)  $\left. \begin{array}{l} £812 \ 10s. \ 10d. : 100 \\ 4\frac{3}{4} : £771 \ 18s. \ 3\frac{1}{2}d. \end{array} \right\} :: 1 \text{ yr.} : \frac{375051900}{97505 \times 19} = 20 \text{ yrs.} \text{ Ans.}$

**Ex. 62.** (p. 107.)

- (1) Bill drawn 6th March at 7 mths.; due 9th Oct.; discounted 15th Sept., or 24 days before due. Int. on 100 for 24 days at 5 p. c.

$$= \frac{24}{73}$$

$$100\frac{24}{73} : \frac{24}{73} :: £419 \ 12s. \ 1d. : £419 \ 12s. \ 1d. \times 6 \div 1831$$

$$= £1 \ 7s. \ 6d. \ \text{Ans.}$$

- (2) Bill drawn 12th Sept. at 5 mths.; due 15th Feb.; discounted 13th Jan., or 33 days before due. Int. on 100 for 33 days at

$$4 \text{ p. c.} = \frac{132}{365}$$

$$100\frac{132}{365} : \frac{132}{365} :: £457 \ 18s. : £457 \ 18s. \times 33 \div 9158$$

$$= 33s. = £1 \ 13s. \ \text{Ans.}$$

- (3) Bill drawn 29th Feb. at 3 mths.; due 1st June; discounted 27th April, or 35 days before due. Int. on 100 for 35 days at

$$3\frac{3}{4} \text{ p. c.} = \frac{105}{292}$$

$$100\frac{105}{292} : \frac{105}{292} :: £537 \ 5s. \ 2d. : 64471s. \times 7 \div 11722 = 38s. \ 6d. \ \text{Ans.}$$

- (4) Bill drawn 17th March at 3 mths.; due 20th June; discounted 31st May, or 20 days before due. Int. on 100 for 20 days at

$$6 \text{ p. c.} = \frac{24}{73}$$

$$100\frac{24}{73} : \frac{24}{73} :: £755 \ 5s. \ 9d. : 60423s. \times 3 \div 3662 = 49s. \ 6d. \ \text{Ans.}$$

- (5) Bill drawn 5th Aug. at 5 mths.; due 8th Jan.; discounted 6th Dec., or 33 days before due. Int. on 100 for 33 days at

$$3\frac{1}{8} \text{ p. c.} = \frac{22}{73}$$

$$100\frac{22}{73} : \frac{22}{73} :: £1006 \ 15s. \ 6d. : £1006 \ 15s. \ 6d. \times 11 \div 3661$$

$$= £3 \ 0s. \ 6d. \ \text{Ans.}$$

- (6) Bill drawn 30th April at 90 days; due 1st Aug.; discounted 18th June, or 44 days before due. Int. on 100 for 44 days at

$$3 \text{ p. c.} = \frac{132}{365}$$

$$100\frac{132}{365} : \frac{132}{365} :: £1144 \ 15s. : £4579 \times 33 \div 36632 = 33 \div 8$$

$$= £4 \ 2s. \ 6d. \ \text{Ans.}$$

- (7) Bill drawn 31st May at 4 mths.; due 3rd Oct.; discounted 8rd Sept., or 30 days before due. Int. on 100 for 30 days at 5 p. c. =  $\frac{30}{73}$ .
- ✓  $100\frac{30}{73} : \frac{30}{73} :: £1337 \text{ 14s. 6d.} : £1337 \text{ 14s. 6d.} \times 3 \div 733$   
 $= £5 \text{ 9s. 6d. Ans.}$
- (8) Bill drawn 25th Dec. at 2 mths.; due 28th Feb.; discounted 8th Feb., or 20 days before due. Int. on 100 for 20 days at 6 p. c. =  $\frac{24}{73}$ .
- $100\frac{24}{73} : \frac{24}{73} :: £1846 \text{ 5s. 2d.} : £1846 \text{ 5s. 2d.} \times 6 \div 1831$   
 $= £6 \text{ 1s. Ans.}$
- (9) Int. on 100 for  $3\frac{1}{2}$  yrs. at 5 p. c. =  $5 \times 3\frac{1}{2} = 17\frac{1}{2}$ .  
 $117\frac{1}{2} : 17\frac{1}{2} :: £1336 \text{ 11s. 3d.} : £199 \text{ 1s. 3d. Ans.}$
- (10) Int. on 100 for 4 yrs. at  $5\frac{3}{8}$  p. c. =  $5\frac{3}{8} \times 4 = 21\frac{1}{2}$ .  
 $121\frac{1}{2} : 100 :: £151\frac{1}{8} : 121500 + 972 = £125. Ans.$
- (11) Int. on 100 for  $1\frac{2}{3}$  yr. at  $2\frac{1}{2}$  p. c. =  $\frac{5}{2} \times \frac{96}{73} = \frac{240}{73}$ .
- ✓  $100 + \frac{240}{73} : 100 :: £598 \text{ 9s. 9d.} : \frac{395}{377} \text{ of } £598 \text{ 9s. 9d.}$   
 $= 1 - \frac{12}{377} \text{ of ditto} = £598 \text{ 9s. 9d.} - £19 \text{ 1s.} = £579 \text{ 8s. 9d. Ans.}$
- (12) Int. on 100 for  $3\frac{1}{2}$  yrs. at  $4\frac{1}{4}$  p. c. =  $\frac{17}{4} \times \frac{7}{2} = \frac{119}{8}$   
 $100 + \frac{119}{8} : \frac{119}{8} :: £210 \text{ 12s. 1d.} : £27 \text{ 5s. 5d. Ans.}$

**Ex. 65.** (p. 109.)

- (1)  $\frac{£27 \text{ 13s. 6d.}}{100} = \frac{1}{20} = \frac{1 \text{ 7 } 8\frac{1}{16}}{26 \text{ 5s. 9}\frac{9}{16}\text{d.}} \text{ Ans.}$  (2)  $\frac{£2516 \text{ 10s. 0d.}}{100} = \frac{3\frac{1}{8}}{32} = \frac{1}{32} = \frac{£78 \text{ 12s. 9}\frac{3}{4}\text{d.}}{4} \text{ Ans.}$
- (3)  $£2286\frac{2}{3} \times \frac{3\frac{1}{2}}{100} = \frac{686}{3} \times \frac{7}{20} = £80 \text{ 0s. 8d. Ans.}$
- (4)  $95\frac{5}{8} : 100 :: £427 \text{ 15s. 3d.} : £447 \text{ 6s. 8d. Ans.}$

- (5)  $\frac{\text{£}27\ 17s.\ 5d.}{100} = \frac{1}{20} = \frac{1\ 7\ 10\frac{9}{20}}{\text{£}26\ 9s.\ 6\frac{11}{20}d.}$  *Ans.*
- (6)  $\frac{\text{£}273\ 15s.\ 0d.}{100} = \frac{3s.\ 4d.}{600} = \frac{1}{600} = \text{£}0\ 9s.\ 1\frac{1}{2}d.$  *Ans.*
- (7)  $92\frac{1}{3} : 100 :: \text{£}5263 : \text{£}5700.$  *Ans.*
- (8)  $\text{£}713\frac{1}{3} \times \frac{2\frac{3}{4}}{100} = \frac{214}{3} \times \frac{11}{40} = \text{£}19\ 12s.\ 4d.$  *Ans.*
- (9)  $100 : 2\frac{3}{5} :: \text{£}3208\ 17s.\ 1d. : \text{£}83\ 8s.\ 7\frac{1}{4}d.$  *Ans.*
- (10)  $100 \times 20s. : 42\frac{1}{3}s. :: \text{£}1237\ 10s. : \text{£}26\ 3s.\ 10\frac{1}{2}d.$  *Ans.*
- (11)  $\text{£}100 : \text{£}\frac{1}{6} :: \text{£}768\ 2s.\ 6d. : \text{£}128\ 0s.\ 5d. + 100 = 25s.\ 7\frac{1}{2}d.$  *Ans.*
- (12)  $97\frac{2}{3} : 100 :: \text{£}4384\ 0s.\ 3d. : \text{£}4488\ 15s.$  *Ans.*

**Ex. 66.** (p. 111.)

- (1)  $\frac{1000}{100}$  cents at  $82\frac{1}{8} = \text{£}82\frac{1}{8} \times 10 = \text{£}821\ 5s.$  *Ans*  
 Gain for each cent =  $86\frac{1}{4} - 82\frac{1}{8} = \text{£}4\frac{1}{8};$   
 Do. for 10 cents =  $\text{£}4\frac{1}{8} \times 10 = \text{£}41\ 5s.$  *Ans.*
- (2)  $\frac{1188}{81}$  c ts at 3 =  $\text{£}14\frac{2}{3} \times 3 = \text{£}44.$  *Ans.*
- (3)  $\frac{3000}{84\frac{3}{8}}$  nts at 3 =  $\frac{\text{£}3 \times 24000}{675} = \text{£}106\ 13s.\ 4d.$  *Ans.*
- (4)  $\frac{4200}{90}$  cents at  $3\frac{1}{4} = \text{£}13 \times 35 + 3 = \text{£}151\ 13s.\ 4d.$  *Ans.*
- (5)  $2766\frac{2}{3} : 100 :: 2490 : 90.$  *Ans.*
- (6)  $3 : 500 : 94\frac{1}{4} : \text{£}15708\ 6s.\ 8d.$  *Ans.*
- (7) Cost of  $\text{£}100$  stock =  $92\frac{1}{2} + \frac{1}{8} = \text{£}92\frac{5}{8};$   
 $\frac{494}{92\frac{5}{8}}$  cents. =  $100 \times \frac{3952}{741} = 100 \times \frac{16}{3} = \text{£}533\ 6s.\ 8d.$  *Ans.*
- (8)  $\frac{850}{100}$  cents at  $(90\frac{5}{8} + \frac{1}{8}) = \frac{17}{2} \times \frac{363}{4} = \text{£}771\ 7s.\ 6d.$  *Ans.*

Also, loss for each cent =  $90\frac{3}{4} - 89\frac{1}{2} = £1\frac{1}{4}$ ;

do. for  $8\frac{1}{2}$  cents =  $£1\frac{1}{4} \times 8\frac{1}{2} = £10$  12s. 6d. *Ans.*

(9)  $96 : 1000 :: £1 : £10$  8s. 4d. *Ans.*

(10)  $93 : 4650 :: £\frac{1}{2} : £25$ . *Ans.*

(11)  $\frac{5000}{100}$  cents at  $£3 = £150 =$  1st income;  
 $\frac{72 \times 50}{90}$  cents at  $£4 = £160 =$  2nd income;  
 An increase of  $£10$ . *Ans.*

(12)  $\frac{11000}{100}$  cents at  $£4 = £440 =$  1st income;  
 $\frac{92 \times 110}{110}$  cents at  $£5 = £460 =$  2nd income;  
 An increase of  $£20$ . *Ans.*

(13) The respective rates of income for each £ invested are  
 $\frac{1}{92}$  of  $£4$  and  $\frac{1}{69}$  of  $£3\frac{1}{3}$ ; or  $£\frac{1}{23}$  and  $£\frac{10}{207}$ ;  
 $\therefore \frac{10-9}{207} \times 3450 = £16$  13s. 4d. *Ans.*

(14)  $\frac{18150}{90\frac{3}{4}} = 200$  cents at  $£3 = £600$ , the 1st income;  
 $\frac{91 \times 200}{97\frac{1}{2}} = \frac{560}{3}$  cents at  $£3\frac{1}{2} = £653\frac{1}{3}$ , 2nd income;  
 $\therefore$  the increase is  $£53$  6s. 8d. *Ans.*

(15) What I buy for  $£1110$  should be sold for  $£1210$ ;  
 $1110 : 1210 :: 92\frac{1}{2} : 100\frac{5}{8}$ . *Ans.*

(16) The respective rates of income for each £ invested would be  
 $\frac{2}{179}$  of  $£3$  and  $\frac{2}{197}$  of  $£3\frac{1}{2} = \frac{1182}{179 \times 197}$  and  $\frac{1253}{179 \times 197}$ ;  
 the latter being the greater,  $\therefore$  the  $3\frac{1}{2}$  per cents are best. *Ans.*

(17)  $\frac{3750}{100}$  cents at  $95 = £95 \times 37\frac{1}{2}$ ; the amount of which by compound  
 interest is  $95 \times 37\frac{1}{2} \times 1.04^2$ ;  
 hence,  $\frac{95 \times 37\frac{1}{2} \times 1.04 \times 1.04}{104}$  cents. at  $£3\frac{1}{2} =$   
 $37\frac{1}{20}$  cts. at  $£3\frac{1}{2} = £129$  13s. 6d., latter income;  
 $37\frac{1}{2}$  cents at  $£3 =$  112 10 0 former income;  
 An increase of  $£17$  3s. 6d. *Ans.*

- (18)  $\frac{1000}{100} = 10$  cents at  $\pounds 3\frac{1}{2} = \pounds 35$ , income; and the additional income will be  $= \pounds 200 - \pounds 35 = \pounds 165$ ;  
 $\pounds 165 \div \pounds 3 = 55$  cents, or  $\pounds 3500$  of 3 p. c. stock. *Ans.*  
 $10$  cents at  $83\frac{5}{8} = \pounds 836$  5s. 0d. }  
 $55$  cents at  $77\frac{1}{8} = \pounds 4241$  17s. 6d. } *Ans.*
- (19) Increase of capital by selling out  $\pounds 100$  stock  $= \pounds 94\frac{5}{8} - \pounds 89\frac{3}{8}$   
 $= \pounds 5\frac{1}{4}$ ; to which add  $\frac{1}{2}$  of  $\pounds 3$  or  $\pounds 1\frac{1}{2}$ ;  
 $6\frac{3}{4} : 54 :: \pounds 89\frac{3}{8} : \pounds 715$ . *Ans.*
- (20)  $72$  guin.  $= \pounds 75$  12s.  
 $\frac{1001}{89\frac{3}{8}}$  cents  $= \frac{56}{5}$  cents at  $\pounds 3 = \pounds 33$  12s., dividend;  
 Gain by selling out  $= \pounds 42$ ;  
 $1001 : 1001 + 42 :: 89\frac{3}{8} : 93\frac{3}{8}$ . *Ans.*

**Ex. 67.** (p. 113.)

- (1)  $100 : 18s. 9d. :: 116$   
 or  $100 : 75s. :: 29 : 21s. 9d.$  *Ans.*
- (2)  $67d. : 100 :: 8d. : 11\frac{23}{27}$  p. c. *Ans.*
- (3)  $82 : 94s. 6d. :: 100 : 115\frac{10}{11}s. = \pounds 5$  15s.  $2\frac{38}{41}d.$  *Ans.*
- (4)  $22s. 11d. : 100 :: 2s. 9d.$   
 or  $275 : 100 :: 33 : 12$  p. c. *Ans.*
- (5)  $85s. 3\frac{1}{13}d. : 14s. 5\frac{12}{13}d. :: 100$   
 or  $133 : 2261 :: 1 : 17$  p. c. *Ans.*
- (6)  $\pounds 359$  6s. 8d.  
 $2048$  yds. at  $3s. 2\frac{1}{2}d. = \pounds 328$  10s. 8d.  
 Whole gain,  $\pounds 30$  16s. 0d. *Ans.*  
 $\pounds 328$   $10\frac{3}{8}s. : 100 :: \pounds 30$  16s.  
 or  $19712 : 100 :: 1848 : 9\frac{3}{8}$  p. c. *Ans.*
- (7)  $48\frac{3}{8} : 100 :: 5\frac{3}{8}$   
 or  $387 : 100 :: 43 : 11\frac{1}{5}$  p. c. *Ans.*  
 Also,  $\pounds 5\frac{3}{8} \times 39\frac{3}{20} = \pounds 210$  8s.  $7\frac{1}{2}d.$  *Ans.*
- (8)  $64$  ells  $= \frac{5}{4}$  yd.  $\times 64 = 80$  yds.  
 Prime cost of 1 yd.  $= \pounds 115 + 80 = \pounds 23 + 16$   
 $100 : \pounds 23 \frac{23}{16} :: 118 : \frac{\pounds 23 \times 118}{16 \times 100}$   
 $= 1357 \div 800 = \pounds 1$  13s.  $11\frac{1}{10}d.$  *Ans.*



- (9) 1 cwt. sold for  $\pounds 109\frac{1}{8} \div 96 = \pounds \frac{291}{256}$ ;  
 $112\frac{1}{2} : \pounds \frac{291}{256} :: 100$   
 or  $225 \times 128 : 291 :: 100 : \pounds 1 \text{ Os. } 2\frac{1}{2}d.$  *Ans.*
- (10) Loss per yd. =  $\pounds 11 \text{ 4s.} + 112 = 2s.$   
 $112 \text{ yds. at } \pounds 2 \text{ 10s.} = \pounds 280$  prime cost of whole. *Ans.*  
 $50s. : 100 :: 2s. : 4 \text{ p. c.}$  *Ans.*
- (11) 112 lbs. at  $\frac{1}{3}$  of  $(5s. 6d. + 6s. 5d. + .4s. 9d.) = \frac{5600}{9} s.$   
 $\frac{5600}{9} s. : 100 :: 658s.$   
 or  $56 : 9 :: 658 : 105\frac{3}{4}$ ; or  $5\frac{3}{4} \text{ p. c. gain.}$  *Ans.*
- (12)  $100 - 91\frac{1}{4} = 8\frac{3}{4} \text{ p. c. damage;}$   
 $100 : \frac{1}{7} \text{ of } \pounds 6600 :: 8\frac{3}{4} : \pounds 66 \times 1\frac{1}{4} = \pounds 82 \text{ 10s.}$  *Ans.*
- (13) 500 copies at 5s. =  $\pounds 500 \div 4 = \pounds 125 \text{ 0s.}$   
 $34 \text{ p. c.} = \pounds 5 \times 64 \div 4 = \pounds 42 \text{ 10s.}$   
 Author's profit,  $\underline{\pounds 37 \text{ 15}}$   
 $\begin{array}{r} 80 \text{ 5} \\ \pounds 44 \text{ 15s.} \end{array}$  *Ans.*
- (14) 112 lbs. at 1s. 3d. = 140s. per cwt.  
 $105\frac{1}{2}s. : 140s. :: 105\frac{1}{2} : 140$ , or 40 p. c. *Ans.*
- (15)  $\pounds 92 \text{ 13s.} + 218 = 8s. 6d.$  a yard;  
 $108 : 117 :: 8s. 6d. : 9s. 2\frac{1}{2}d.$  *Ans.*
- (16) 50 rms. : 45 rms. :: 108 :  $97\frac{1}{5}$ , or  $2\frac{1}{5} \text{ p. c. loss.}$  *Ans.*
- (17)  $100 : 112 :: \pounds 15 : \pounds 16 \text{ 16s.}$   
 $\pounds 16 \text{ 16s.} : \pounds 1 \text{ 1s.} :: 4 \text{ cwt.} : \frac{1}{4} \text{ cwt. damaged.}$   
 $\pounds 16 \text{ 16s.} + 3\frac{3}{4} = \pounds 4 \text{ 9s. } 7\frac{1}{2}d.$  *Ans.*
- (18)  $\frac{1}{4}$  of 10s. 3d. +  $\frac{1}{3}$  of 8s. 6d. +  $\frac{5}{12}$  of 7s.  
 or,  $2s. 6\frac{3}{4}d. + 2s. 10d. + 2s. 11d. = 8s. 3\frac{3}{4}d.$ , selling price per yd.;  
 $8s. 3\frac{3}{4}d. - 7s. 10\frac{1}{2}d. = 5\frac{1}{2}d.$  the gain per yard;  
 $94\frac{1}{2}d. : 100 :: 5\frac{1}{2}d. : 5\frac{5}{9} \text{ p. c. gain.}$  *Ans.*
- (19)  $140 : 7d. :: 100 : 5d.$  the prime cost of the number sought.  
 $1d. : 5d. :: 5 \text{ eggs} : 25 \text{ eggs.}$  *Ans.*
- (20) On the prime cost of every 11 pins he gains the prime cost of 7;  
 hence,  $11 : 100 :: 7 : 63\frac{7}{11} \text{ p. c. gain.}$  *Ans.*

**Ex. 68.** (p. 116.)

- (1)  $3 + 5 + 7 = 15$ ;  $\frac{1}{15}$  of 1065 = 71 ;  
 $\therefore \left. \begin{array}{l} 3 \dots 15ths = 71 \times 3 = 213 \\ 5 \dots 15ths = 71 \times 5 = 355 \\ 7 \dots 15ths = 71 \times 7 = 497 \end{array} \right\} \text{Ans.}$   
 Also,  $\frac{1}{3}, \frac{1}{5}, \frac{1}{7}$  are as 35, 21, and 15 ;  
 $35 + 21 + 15 = 71$ ; and  $\frac{1}{71}$  of 1065 = 15 ;  
 $\therefore \left. \begin{array}{l} 35 \dots 71ths = 15 \times 35 = 525 \\ 21 \dots 71ths = 15 \times 21 = 315 \\ 15 \dots 71ths = 15 \times 15 = 225 \end{array} \right\} \text{Ans.}$
- (2) The shares are as 128, 176, and 192, or as 8, 11, and 12 ;  
 hence  $\frac{8}{31}, \frac{11}{31},$  and  $\frac{12}{31}$  of £279 = £72, £99, £108. *Ans.*
- (3)  $\frac{100}{111}$  of 16 cwt. 3 qrs. 11 lbs. = 1700 lbs. = 15 cwt. 0 qrs. 20 lbs. C. }  
 $\frac{11}{111}$  of ditto = 187 lbs. = 1 cwt. 2 qrs. 19 lbs. T. }  
*Ans.*
- (4) The given fractions are as 140, 105, 84, 70, 60; sum = 459.  
 £153 + 459 = £ $61\frac{1}{3}$ ; which  $\times$  the proportional numbers will give  
 £46 13s. 4d., £35, £28, £23 6s. 8d., and £20. *Ans.*
- (5)  $1 + 8 + 27 + 64 = 100$ ;  $1400 \div 100 = 14$ ; which  $\times$  the proportional  
 numbers gives 14, 112, 378, and 896. *Ans.*
- (6) The gases are in the proportion of 889 to 111 ; sum 1000 ;  
 $1000 \text{ oz.} \div 1000 = 1 \text{ oz.}$ ; therefore, the weights are 889 oz. and  
 111 oz. *Ans.*
- (7) The shares are as  $1, \frac{1}{2},$  and 3; or as 2, 1, and 6; sum = 9;  
 $£300 \div 9 = £33\frac{1}{3}$ ; hence, the shares are £66 13s. 4d.,  
 £33 6s. 8d., and £200. *Ans.*
- (8) A works 216 hrs. a month;  
 B works  $(6\frac{1}{4} + 8\frac{1}{2} + 10\frac{3}{4} + 12) \times 4 = 150$  hrs. a month;  
 Shares as 216 to 150, or as 36 to 25; sum 61;  
 $£11 \text{ 12s. } 6\frac{3}{4}d. \div 61 = 3s. 9\frac{3}{4}d.$ ; which  $\times$  36 and 25  
 gives A £6 17s. 3d., and B £4 15s. 3 $\frac{3}{4}$ d. *Ans.*

- (9) 37 parts in 40, or  $\frac{37}{40}$  of the coinage are pure silver;  
 weight of 20 shillings =  $\frac{20}{66}$  of a lb. Troy =  $\frac{40}{11}$  oz. Troy;  
 $\frac{37}{40}$  of  $\frac{40}{11}$  oz. =  $\frac{37}{11}$  oz. = 3 oz. 7 dwt.  $6\frac{5}{11}$  grs. *Ans.*
- (10) The proportions of nitre, sulphur, and charcoal in the ton will be  
 75 + 77, 10 + 9, and 15 + 14, or 152, 19, and 29; sum 200;  
 1 ton + 200 =  $11\frac{1}{2}$  lbs.; which, multiplied by the proportional nos.  
 gives 1702 $\frac{1}{2}$  lbs. N., 212 $\frac{1}{2}$  S., 324 $\frac{1}{2}$  C. *Ans.*
- (11) 22 parts in 24, or  $\frac{11}{12}$ , of the coinage are pure gold;  
 weight of 100 sovereigns =  $100 + 46\frac{22}{40} = \frac{4000}{1869}$  lbs. Troy;  
 $\frac{11}{12}$  of  $\frac{4000}{1869}$  lbs. =  $\frac{11000}{5607}$  lb. = 1 lb. 11 oz. 10 dwt.  $20\frac{100}{523}$  grs. *Ans.*
- (12)  $\frac{17}{24}$  of 4 oz. =  $2\frac{5}{6}$  oz. fine gold;  
 $\frac{13}{24}$  of 3 oz. =  $1\frac{5}{8}$  oz. ditto;  
 7 oz. of compound contain  $2\frac{5}{8} + 1\frac{5}{8} = 4\frac{11}{8}$  oz. fine gold;  
 $\therefore 3\frac{1}{2}$  oz. ditto contain  $2\frac{11}{8}$  oz. fine gold = 2 oz. 4 dwt. 14 grs. *Ans.*
- (13) A's capital, 4, for three months, is equivalent to a capital of 12  
 for 1 month; similarly, B's capital, 5, for 3 months = a capital of  
 15 for 1 month; &c.  

$$\left. \begin{array}{l} 4 \times 3 = 12 \\ \frac{1}{3} \text{ of } 4 \times 9 = 12 \end{array} \right\} = 24, \text{ A's proportion;}$$

$$\left. \begin{array}{l} 5 \times 3 = 15 \\ \frac{1}{4} \text{ of } 5 \times 9 = 11\frac{1}{4} \end{array} \right\} = 26\frac{1}{4}, \text{ B's proportion;}$$
 hence, dividing the profit as 24 to  $26\frac{1}{4}$ , or 32 to 35, we have  

$$\left. \begin{array}{l} \frac{32}{67} \text{ of } £335 = £160 \text{ A's share} \\ \frac{35}{67} \text{ of } £335 = £175 \text{ B's share} \end{array} \right\} \text{Ans.}$$
- (14) 
$$\left. \begin{array}{l} \frac{1}{2} \times 4 = 2 \\ \frac{1}{4} \times 9 = 2\frac{1}{4} \end{array} \right\} = 4\frac{1}{4}, \text{ A's proportion;}$$

$$\frac{1}{3} \times 13 = 4\frac{1}{3} \text{ B's proportion;}$$

$$\frac{1}{4} \times 13 = 3\frac{1}{4} \text{ C's proportion;}$$
 or the proportions are as 51, 52, and 39; sum 142;  
 then  $£284 \div 142 = £2$ ; which, multiplied by the proportional nos.  
 gives A £102, B £104, C £78. *Ans.*

- (15) A 80 + 40, each for 6 months; B 100 + 50, each for 6 months; C 50 for 6 months. Hence the shares of rent will be as 120, 150, and 50, or as 12, 15, and 5; sum 32.  
 $\pounds 275 \div 32 = \pounds 8 \text{ 11s. } 10\frac{1}{2}\text{d.}$ ; which  $\times$  the proportional nos. gives for A  $\pounds 103 \text{ 2s. } 6\text{d.}$ , B  $\pounds 128 \text{ 18s. } 1\frac{1}{2}\text{d.}$ , C  $\pounds 42 \text{ 19s. } 4\frac{1}{2}\text{d.}$  *Ans.*

- (16)  $\frac{13}{24}$  of 10 +  $\frac{12}{24}$  of 4 +  $\frac{11}{24}$  of 2 +  $\frac{10}{24}$  of 4 =  $\frac{240}{24}$  or 10 oz. of fine gold in a compound of 20 oz., which is 12 oz. in 24, or 12 carats fine.  
*Ans.*

- (17) In the 1st instance there will be 10 oz. fine gold in a compound of 16 oz., which is  $\frac{10}{16} = \frac{5}{8} = \frac{15}{24}$ , or 15 carats fine. *Ans.*

In the 2nd instance there will be  $\frac{16}{24} = \frac{2}{3} = \frac{10}{15}$ , or 10 oz. fine gold in a compound of 15 oz.; so that the reduced weight will be 15 oz.  
*Ans.*

- (18)  $\frac{12}{24}$  of 16 oz. -  $\frac{10}{24}$  8 oz. -  $\frac{11}{24}$  of 2 oz. =  $\frac{192 - 80 - 22}{24} = \frac{90}{24}$  oz. fine gold in the 6 oz. =  $\frac{15}{24}$  of 6 oz.; or, the fineness was 15 carats.  
*Ans.*

- (19)  $\left. \begin{array}{l} 35 \times 5 = 185 \\ 32 \times 10 = 320 \\ 40 \times 5 = 200 \end{array} \right\} = 505 \text{ strokes by A;}$   
 $\left. \begin{array}{l} 35 \times 17 = 595 \\ 30 \times 7 = 210 \end{array} \right\} = 795 \text{ strokes by B;}$   
 $\left. \begin{array}{l} 30 \times 7 = 210 \end{array} \right\} = 210 \text{ strokes by C;}$   
 hence, the proportions are as 101, 159, and 42; sum 302;  
 $\therefore 12\text{s. } 7\text{d.} \div 302 = \frac{1}{3}\text{d.}$ ; which  $\times$  the proportional nos. gives A 4s.  $2\frac{1}{2}\text{d.}$ , B 6s.  $7\frac{1}{2}\text{d.}$ , C 1s. 9d. *Ans.*

- (20) At the end of the first 3 months,  
 A's property is  $500 + 150 = 650$ ;  
 B's also  $500 + 150 = 650$ ;  
 but A then makes his = 450, and B his = 850;  
 according to which, viz. as 9 : 17, at the end of  
 the next 3 months, A takes  $\frac{9}{26}$  of 780 = 270;  
 and B takes  $\frac{17}{26}$  of 780 = 510.

Now, A's property,  $450 + 270 = 720$ , is reduced to 520;  
 and B's property,  $850 + 510 = 1360$ , is raised to 1560;  
 according to which, viz. as 1 : 3, the final property,  $\pounds 400$ , is to be divided between them, allowing A  $\frac{1}{4}$  of it, or  $\pounds 100$ , and B  $\frac{3}{4}$ , or  $\pounds 300$ . *Ans.*

## MISCELLANEOUS EXAMPLES.

- (1)  $16\frac{1}{2}$  ft. passed over in 1 revolution; or 1 ft. in  $\frac{2}{33}$  of a rev.; or  
 1 mi. in 5280 times  $\frac{2}{33}$  of a rev.; or 59 mi. in  $\frac{2}{33} \times 5280 \times 59$   
 $= 2 \times 160 \times 59 = 18880$  rev. *Ans.*
- (2) The nett income is 17s. 3d. for every £ the estate produces.  
 $17\frac{1}{2}s. \times 400 = 69s. \times 100 = £345.$  *Ans.*
- (3)  $\frac{4158}{10395} = \frac{462}{1155} = \frac{42}{105} = \frac{2}{5}.$  *Ans.*  
 $1s. = \frac{1}{21}$  of a *guin.*;  $\therefore 35\frac{1}{2}s. = \frac{35\frac{1}{2}}{21}$  or  $\frac{71}{42}$  *guin.* *Ans.*  
 $\frac{3}{28}$  of  $10\frac{1}{2}s. = \frac{21}{2} s. \times \frac{3}{28} = \frac{9}{8} s. = 1s. 1\frac{1}{2}d.$  *Ans.*  
 $\frac{2}{5}$  of  $\frac{10}{21} = \frac{4}{21}$ ; and  $3 + 2\frac{2}{5} = \frac{3}{1} \times \frac{5}{12} = \frac{5}{4}$ ;  
 $\therefore \frac{1}{3} + \frac{4}{21} + \frac{9}{7} + \frac{5}{4} = \frac{28 + 16 + 108 + 105}{84} = \frac{257}{84} = 3\frac{5}{84}.$  *Ans.*
- (4)  $21\frac{1}{2}$  *guin.* + 12 = 21s.  $\times 43 + 24 = 7s. \times 43 + 8 = 37s. 7\frac{1}{2}d.$  to each. *Ans.*
- (5) 145 ac. 1 ro. 32 po. at £10 5s. 3d.  

$$\begin{array}{r} 145 \\ 1 \text{ ro.} = \frac{1}{4} \text{ ac.} \\ 32 \text{ po.} = \frac{1}{8} \text{ ac.} \end{array} \begin{array}{r} 1488 \quad 1 \quad 3 \\ 2 \quad 11 \quad 3\frac{3}{4} \\ 2 \quad 1 \quad 0\frac{3}{8} \\ \hline \end{array}$$
  
 $\underline{\underline{£1492 \quad 13s. \quad 7\frac{7}{80}d.}}$  *Ans.*
- (6) The inquiry is—how many qrs. at 23s. produce as much money  
 as 150 qrs. at 37s.;  
 $\therefore 37 \times 150 \div 23 = 241\frac{7}{23}$  qrs. *Ans.*
- (7) The inches of length required  $\times 6\frac{1}{4} \times 3\frac{1}{2}$  will be  
 $= 6\frac{1}{4} \times 1728$ ;  $\therefore (6\frac{1}{4} \times 1728) \div (6\frac{1}{4} \times 3\frac{1}{2})$   
 $= 3456 \div 7 =$  the length in inches,  
 $= 288 \text{ ft.} \div 7 = 41\frac{1}{7} \text{ ft.}$  *Ans.*
- (8) By investing £170  $\times 50$  in the  $3\frac{1}{2}$  per cents, the income will be  
 $£3\frac{1}{2}$  for every 93 $\frac{1}{2}$  in  $170 \times 50$ , viz.  $\frac{170 \times 50 \times 3\frac{1}{2}}{93\frac{1}{2}} = \frac{85 \times 50 \times 7 \times 3}{280}$   
 $= \frac{85 \times 15}{4} = £318 \text{ 15s.}$  *Ans.*

- (9) 3 lbs. tea = 4 lbs. coffee, and 6 lbs. coffee = 20 lbs. sugar;  
 $\therefore$  9 lbs. tea = 12 lbs. coffee, and 12 lbs. coffee = 40 lbs. sugar. *Ans.*
- (10) The three pastures = 148 ac. 2 ro.  $9\frac{1}{4}$  po.  
 Deduct for tithes  $\begin{array}{r} 11 \quad 2 \quad 15 \\ 60 \overline{) 136 \quad 3 \quad 34\frac{1}{4}} \\ \underline{2 \text{ ac. } 1 \text{ ro. } 5\frac{19}{80} \text{ po.}} \end{array}$  *Ans.*
- (11)  $\sqrt{37,33,21} = 611$ . *Ans.*  $\begin{array}{r} 36 \\ 121 \overline{) 133} \\ \underline{121} \\ 1221 \overline{) 1221} \\ \underline{1221} \end{array}$   $\sqrt{1,06,09,00}$  sq. in. = 1030 in.,  
 144 or, 85 ft. 10 in. *Ans.*  
 $\begin{array}{r} 1 \\ 203 \overline{) 0609} \\ \underline{609} \end{array}$
- (12) Each grain produces 10 grains yearly; so that in 10 yrs. the no. of grains produced from one grain will be =  $10^{10}$ ; and as there are 512 pints in a quarter, and each pint contains 7580 grains, we have  $\frac{10000000000}{7580 \times 512} = \frac{1953125}{758} = 2576\frac{517}{758}$  qrs. *Ans.*
- (13) Loss on 160 f. = 5 f.;  $\therefore$  loss on 1 =  $\frac{1}{32}$ , and on 100 =  $\frac{100}{32} = 3\frac{1}{8}$ . *Ans.*
- (14) In C. each degree is the 100th part of the column between freezing and boiling points; in F. it is the 180th (= 212 - 32).  
 Now, 68 F. is 68 - 32, or 36 above freezing point =  $\frac{36}{180}$  or  $\frac{1}{5}$  of the column between freezing and boiling points;  $\therefore \frac{1}{5}$  of  $100^\circ$  =  $20^\circ$  of C. *Ans.*
- (15) Here we are to find how many gallons of diluted spirits at 10s. 6d. are equivalent to 40 gallons spirits at 13s. 8d.;  
 $\therefore 164d. \times 40 + 126d. = 3280 + 63 = 3343d.$  = 52  $\frac{4}{53}$  gals., showing an addition of  $12\frac{4}{53}$  gals. water. *Ans.*
- (16) As £100 is the true present worth of £102  $\frac{1}{2}$  (payable in 6 months at 5 p. c. per ann.), the true present worth of £100 is  $\frac{100}{102\frac{1}{2}}$   
 $\text{£}100 = \text{£}4000 \div 41 = \text{£}97 \text{ } 11s. \text{ } 2\frac{26}{41}d.$   
 Therefore £97 10s. is less than the due sum by 1s.  $2\frac{26}{41}d.$  *Ans.*
- (17)  $\frac{2}{9}$  of 21s. =  $252d. \times \frac{2}{9} = 28d. \times 2 = 4s. \text{ } 8d.$  *Ans.*

$$27\frac{1}{2}d. = \frac{27\frac{1}{2}}{240} \text{ of a } £ = £\frac{55}{480} = £\frac{11}{96}. \text{ Ans.}$$

1 da. 6 hrs. = 1800 min.; of which 1 min. is  $\frac{1}{1800}$ , and  $67\frac{1}{2}$  min.

$$\text{is } \frac{67\frac{1}{2}}{1800} = \frac{135}{3600} = \frac{3}{80}. \text{ Ans.}$$

$$(18) \quad \frac{1000}{90\frac{5}{8}} = \frac{320}{29} \text{ cents at } £3 = £\frac{960}{29}, \text{ the 1st income;}$$

$$\frac{320}{29} \text{ cents at } 91\frac{1}{4} = \frac{80 \times 365}{29}; \text{ which } \div 97\frac{1}{3} \text{ gives}$$

$$\frac{300}{29} \text{ cents at } £3\frac{1}{2} = £\frac{1050}{29}, \text{ the 2nd income;}$$

$$\frac{1050 - 960}{29} = \frac{90}{29} = £3 \text{ 2s. } 0\frac{24}{29}d. \text{ increase. Ans.}$$

$$(19) \quad \begin{array}{r} 276 \quad 24300 \quad \overline{155736} \\ \quad \quad 1656 \quad \overline{155736} \\ \hline \quad \quad 25956 \end{array} \quad \begin{array}{r} 2784736 = 96. \text{ Ans.} \\ 729 \\ \hline 2576 \\ 10000 \end{array} \quad \begin{array}{r} \frac{161}{625} = \frac{644}{2500} = \\ 2576 \\ 10000 \end{array}$$

$$\sqrt{9,59,51'25,76} = 309'76$$

$$\begin{array}{r} 609 \quad \overline{5951} \\ \quad \quad 5481 \\ \hline 6187 \quad \overline{47025} \\ \quad \quad 43309 \\ \hline 61946 \quad \overline{371676} \\ \quad \quad 371676 \end{array} \quad \begin{array}{r} \sqrt{3,09'76} = 17'6. \text{ Ans.} \\ 1 \\ 27 \quad \overline{209} \\ \quad \quad 189 \\ \hline 346 \quad \overline{2076} \\ \quad \quad 2076 \end{array}$$

(20) The several villages contain 250, 300, 400, and 500 ... 1450ths of the whole no. of inhabitants; = 5, 6, 8, and 10 ... 29ths.

$$\therefore \left( \frac{1}{29} \text{ of } £870 \right) \times 5, 6, 8, 10 = £150, £180, £240, £300. \text{ Ans.}$$

(21) A does 1 measure of work in 1 day, the whole work being 10 such measures;  $\therefore$  B does  $\frac{1}{13}$  of 10 meas. =  $\frac{10}{13}$  meas. in 1 day;

$\therefore$  A and B together do  $1\frac{10}{13}$  meas. per day;

$\therefore$  A and B together do the whole work, viz. 10 meas. in  $10 \div 1\frac{10}{13} = 130 \div 23 = 5\frac{15}{23}$  days. Ans.

(22) The prime cost is  $\frac{5}{8}$  of 11s.

$$11s. \times \frac{5}{8} : 100 :: 13s. 6d. : \frac{100 \times 13\frac{1}{2}}{11 \times \frac{5}{8}} = \frac{10800}{55}$$

$$= 2160 \div 11 = 196\frac{4}{11}, \text{ or } 96\frac{4}{11} \text{ p. c. Ans.}$$

$$(23) \quad \frac{3872}{92807} = \frac{352 \times 11}{8437 \times 11} = \frac{32 \times 11}{767 \times 11} = \frac{32}{767}. \quad \text{Ans.}$$

$$\frac{5}{12} + \frac{4}{15} + \frac{11}{21} = \frac{175 + 112 + 220}{420} = \frac{507}{420} = \frac{169}{140};$$

$$\therefore 17 + 144 + 1\frac{29}{140} = 162\frac{29}{140}. \quad \text{Ans.}$$

$$2\frac{13}{35} - \frac{17}{25} = 2\frac{65}{175} - \frac{119}{175} = 2 - \frac{54}{175} = 1\frac{121}{175}. \quad \text{Ans.}$$

$$\frac{8}{7} \times \frac{8}{4} \times \frac{11}{23} \times \frac{11}{8} \times \frac{4}{5} = \frac{11}{115}. \quad \text{Ans.}$$

$$6347 + 2\frac{3}{4} = 25388 \div 11 = 2308. \quad \text{Ans.}$$

$$(24) \quad \sqrt{01,59,51,69} = \cdot 1263. \quad \text{Ans.} \quad \sqrt{16,934,994,432} = 25\cdot 68. \quad \text{Ans.}$$

$\begin{array}{r} 144 \\ 246 \overline{)1551} \\ \underline{1476} \\ 2523 \overline{)7569} \\ \underline{7569} \end{array}$	$\begin{array}{r} 8 \\ 65 \quad 1200 \overline{)8934} \\ \underline{325} \\ 1525 \overline{)1309994} \\ \underline{1152216} \\ 4536 \overline{)157778432} \\ \underline{192036} \\ 7688 \overline{)19660800} \\ \underline{61504} \\ 19722304 \end{array}$
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$$(25) \quad \begin{array}{lll} A = 5 \times 9 = 45 & \text{sheep for } \frac{1}{2} \text{ a month;} \\ B = 8 \times 10 = 80 & \text{do.} & \text{do.} \\ C = 9 \times 13 = 117 & \text{do.} & \text{do.} \\ & \underline{242} \end{array}$$

$$\left( \frac{1}{242} \text{ of } 1210s. \right) \times 45, 80, 117 = \pounds 11\frac{1}{2}, \pounds 20, \pounds 29\frac{1}{2}. \quad \text{Ans.}$$

$$(26) \quad \begin{array}{l} \text{Int. on } \pounds 100 = \pounds 5 \times 1\frac{1}{4} \text{ yr.} = \pounds 6\frac{1}{4}; \\ \therefore 100 \text{ is the present worth of } 106\frac{1}{4}; \\ 106\frac{1}{4} : \pounds 75 :: 100 : \pounds \frac{30000}{425} = \pounds \frac{120000}{1700} \\ = \pounds 1200 \div 17 = \pounds 70 \text{ } 11s. \text{ } 9\frac{3}{17}d. \quad \text{Ans.} \end{array}$$

$$(27) \quad \begin{array}{l} A \text{ does 1 measure of work in 1 day, and the whole work is 10} \\ \text{such measures; of which A and B together do } \frac{1}{2} = 1\frac{1}{2} \text{ meas. in a} \\ \text{day; } \therefore B \text{ does } 1\frac{1}{2} - 1, \text{ or } \frac{1}{2} \text{ meas. in a day, or the whole 10} \\ \text{meas. in } 10 \div \frac{1}{2} \text{ or } 20 \text{ days.} \quad \text{Ans.} \end{array}$$



(28)

$$2/134,217,728 = 512. \text{ Ans.}$$

		125	
151	7500	9217	
	151	7651	
	7651	1566728	
1532	780300	1566728	
	3064		
	783364		

$$2/80,677,568,161 = 4321. \text{ Ans.}$$

		64	
123	4800	16677	
	369	15307	
	5169	1170568	
1292	554700	1114568	
	2584	56000161	
	557284	56000161	
12961	55987200		
	12961		
	56000161		

$$(29) \quad \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} = 30 + 20 + 15 + 12 \text{ sixtieths,} = 77 \text{ sixtieths.}$$

$$\therefore \left( \frac{1}{77} \text{ of } 3850d. \right) \times 30, 20, 15, 12, \text{ severally, gives}$$

$$£6 \text{ } 5s., £4 \text{ } 3s. \text{ } 4d., £3 \text{ } 2s. \text{ } 6d., £2 \text{ } 10s. \text{ Ans.}$$

$$(30) \quad 7 \cdot 625 \pm 5 \cdot 375 = 13 \text{ and } 2 \cdot 25, \text{ which are as } 52 \text{ to } 9;$$

$$\left( \frac{1}{61} \text{ of } 1037 \right) \times 52 \text{ and } 9, = 884 \text{ and } 153. \text{ Ans.}$$

(31) The discharging pipe empties 1 measure in a minute, and the whole content is 25 such measures;  $\therefore$  the supplying pipes run  $\frac{1}{40} + \frac{1}{60}$ , or  $\frac{2}{200}$  of 25 meas. per min.  $= 1\frac{1}{8}$  meas. per minute;  $\therefore$  there is retained per minute  $1\frac{1}{8} - 1 = \frac{1}{8}$  of a measure, or the whole 25 meas. in  $25 \div \frac{1}{8} = 200$  min.  $= 3$  hrs. 20 min. *Ans.*

$$(32) \quad \frac{2}{3} \text{ of } \frac{4}{5} \text{ of } \frac{3}{2} = \text{the no.} = \frac{4}{5}; \text{ the square of which is } \frac{16}{25}. \text{ Ans.}$$

$$(33) \quad 21\frac{1}{2}s. \times 1296 + 21s. = 43 \times 648 + 21 = 1326\frac{1}{2}. \text{ Ans.}$$

(34)  $\sqrt{82,44'64} = 90'8$ . *Ans.*

$\sqrt{8,24'46,40} = 28'71348$ . *Ans.*

$$\begin{array}{r}
 4 \\
 48 \overline{) 424} \\
 \underline{384} \\
 567 \overline{) 4046} \\
 \underline{3969} \\
 5741 \overline{) 7740} \\
 \underline{5741} \\
 57423 \overline{) 199900} \\
 \underline{172269} \\
 276310 \\
 \underline{229692} \\
 466180 \\
 \underline{459384} \\
 6796 \text{ \&c.}
 \end{array}$$

*Note.*—After a few figures of an interminable root are found, additional figures may be found, as here, by simple division.

(35)  $\left. \begin{array}{l} 8 : 6 \text{ m.} \\ 15 : 20 \text{ yds.} \\ 4 : 8 \text{ yds.} \\ 8 : 12 \text{ hrs.} \end{array} \right\} :: 3 \text{ da.} : \frac{3 \times 6 \times 20 \times 12}{8 \times 15 \times 4} = 9 \text{ da.} \text{ } \textit{Ans.}$

(36)  $13s. 7\frac{1}{2}d. = 13\frac{5}{8}s. = 13'625s. = \mathcal{L}'68125$ . *Ans.*  
 $\frac{3}{4}$  of  $17\frac{1}{2}d. = 7\frac{1}{2}d. = 7\frac{1}{2}$  times the 30th of half-a-crown,  
 $= \frac{15}{60}$  or  $\frac{1}{4}$  of half-a-crown. *Ans.*

$1001 + 390625 = 8008 \div 3125000 = 8'008 \div 3125$   
 $= 64'064 \div 25000 = 256'256 \div 100000 = '00256256$ . *Ans.*  
 $1001 + '000390625 = 1001 \div 3'90625 = 8008 \div 31'25$   
 $= 32032 \div 125 = 256256 \div 1000 = 256'256$ . *Ans.*  
 $10'01 + 390'625 = 80'08 \div 3125 = 640'64 \div 25000$   
 $= 2562'56 \div 100000 = '0256256$ . *Ans.*

(37)  $6 + 24 = 30$  p. c. profit on  $3s. 9d.$   
 $100 : 130 :: 45d. : 4s. 10\frac{1}{2}d.$  *Ans.*

(38)  $360^\circ = 360 \times 60 \text{ min.}$   
 $365 \text{ da. } 5 \text{ hrs. } 48 \text{ min.} = 365 \text{ da. } 5\frac{1}{2} \text{ hrs.} = 365\frac{39}{120} \text{ da.}$   
 $\frac{360 \times 60 \times 120}{43829} = 59 \text{ min. } 8\frac{14708}{43829} \text{ sec.} \text{ } \textit{Ans.}$

(39)  $10 \text{ men} = 20 \text{ wom.} = 40 \text{ chil.}$   
 $13 \text{ wom.} = 26 \text{ chil.}$

$\frac{25}{\text{Hence } 300s. = 91 \text{ times the share of a child ;}}$   
 $\left. \begin{array}{l} \text{or, each child gets } 3s. 3\frac{1}{2}d. \\ \text{,, woman ,, } 6s. 7\frac{1}{2}d. \\ \text{,, man ,, } 13s. 2\frac{1}{2}d. \end{array} \right\} \textit{Ans.}$

$$(40) \frac{3}{8} + \left(\frac{3}{2}\right)^3 \times \sqrt{\frac{16}{9}} = \frac{3}{8} \times \frac{8}{27} \times \frac{4}{3} = \frac{4}{27}. \text{ Ans.}$$

$$(41) 1\frac{1}{2}d. \times 24\frac{1}{3} \times 96\frac{1}{2} = \frac{1}{4} \text{ of } 73d. \times 193 = £14 \text{ } 13s. \text{ } 6\frac{1}{2}d. \text{ Ans.}$$

$$(42) 30 \times \frac{4}{5} \times \frac{1}{3} \times \frac{7}{8} \text{ sold for } £210 \times \frac{8}{9} \times \frac{9}{26} \times \frac{3}{14};$$

$$\text{or } 1 \text{ sold for } £\frac{210}{30} \times \frac{8}{9} \times \frac{9}{26} \times \frac{3}{14} \times \frac{5}{4} \times \frac{3}{1} \times \frac{8}{7};$$

$$= £\frac{8}{26} \times \frac{3}{14} \times \frac{5}{4} \times 24 = £\frac{180}{91} = £1 \text{ } 19s. \text{ } 6\frac{6}{91}d. \text{ Ans.}$$

$$(43) A = \frac{2}{3} \text{ of } B; B = \frac{4}{5} \text{ of } C; C = \frac{5}{7} \text{ of } D;$$

$$\text{or, } A = \frac{2}{3} \text{ of } B = \frac{2}{3} \text{ of } \frac{4}{5} \text{ of } C = \frac{2}{3} \text{ of } \frac{4}{5} \text{ of } \frac{5}{7} \text{ of } D;$$

$$\text{or, } A + 1 = B \div \frac{3}{2} = C + \frac{15}{8} = D + \frac{35}{8};$$

$$\text{or, the debts are as 16, 24, 30, and 35; sum 105;}$$

$$£21000 \div £105 = £200; \text{ which multiplied by the proportional}$$

$$\text{nos. gives } £3200, £4800, £6000, \text{ and } £7500. \text{ Ans.}$$

$$(44) 63 \text{ lbs.} \times 1 \text{ c. ft.} \times 16\frac{7}{12} \times 8\frac{1}{2} = \frac{63 \text{ lbs.} \times 199 \times 25}{12 \times 3}$$

$$= \frac{63 \text{ tons} \times 199 \times 25}{36 \times 112 \times 20} = \frac{199 \text{ tons} \times 5}{4 \times 16 \times 4}$$

$$= 995 + 256 = 3 \text{ tons } 17 \text{ cwt. } 82\frac{1}{2} \text{ lbs. Ans.}$$

$$(45) £1025 \text{ } 12s. \text{ } 7\frac{1}{2}d. : £3296 \text{ } 13s. \text{ } 5\frac{1}{2}d. :: 14 \text{ sh.} : 45 \text{ sh. Ans.}$$

$$(46) \frac{18}{24} \text{ of } 3 \text{ oz. at } 4 \text{ guin.} = \frac{1}{2} \text{ of } 18 \text{ guin.} = £9 \text{ } 9s. \text{ } 0d.$$

$$\frac{6}{24} \text{ of } 3 \text{ oz. at } 3s. \text{ } 4d. = \frac{1}{4} \text{ of } 10s. = 0 \text{ } 2 \text{ } 6$$

$$25 \text{ p. c.} = \frac{1}{4} = \frac{9 \text{ } 11 \text{ } 6}{2 \text{ } 7 \text{ } 10\frac{1}{2}}$$

$$\underline{\underline{£11 \text{ } 19s. \text{ } 4\frac{1}{2}d. \text{ Ans.}}}$$

$$(47) \sqrt{13,76,41} = 371. \text{ Ans.}$$

$$\sqrt{\frac{121}{16}} = \frac{11}{4} = 2\frac{3}{4}. \text{ Ans.}$$

$$\sqrt{06,40} = 25298 \text{ \&c. Ans.}$$

$$\begin{array}{r} 4 \\ 45 \overline{) 240} \\ \underline{225} \\ 1500 \text{ \&c.} \end{array}$$

$$(48) 9\frac{1}{2}d. \times 123\frac{3}{4} \text{ c. ft.} \times 2\frac{1}{2} \times 2$$

$$= 19d. \times 41\frac{1}{4} \times 7 = 5486\frac{1}{4}d. = £22 \text{ } 17s. \text{ } 2\frac{1}{4}d. \text{ Ans.}$$

- (49) 1 degree =  $1\frac{1}{9}$  grade; and 1 grade =  $\frac{9}{10}$  of a degree;  
 $\therefore$  1 deg. + 1 gr. =  $1\frac{9}{10}$  deg., or  $2\frac{1}{10}$  gr.;  
 $36.45 \times 1\frac{9}{10} = 3.645 \times 19 = 69.255$  deg. } *Ans.*  
 $36.45 \times 2\frac{1}{5} = 4.05 \times 19 = 76.95$  gr. }
- (50) 3 men reap  $302\frac{1}{2} \times 3$  sq. yds. in 1 hour;  
 or,  $302\frac{1}{2} \times 3$  ac. in 4840 hrs.;  
 or, 1 ac. in  $\frac{4840 \times 2}{605 \times 3}$  hrs.;  
 or,  $2\frac{7}{8}$  ac. in  $\frac{4840 \times 2 \times 25}{605 \times 3 \times 9} = \frac{40 \times 50}{5 \times 27}$  hrs.  
 $= 400$  hrs.  $\div 27 = 14\frac{22}{27}$  hrs. *Ans.*
- (51) Int. on 100 =  $4\frac{1}{2} \times \frac{2}{3} = 3$ ;  
 $\therefore$  the present worth of 103 is 100; or that of 1 is  $\frac{100}{103}$ ;  
 or that of 156 is  $\frac{15600}{103}$ ;  
 $\frac{\pounds 15600}{103} : 100 :: \pounds 180 : \frac{15 \times 103}{13} = 118\frac{11}{13}$ ;  
 or  $18\frac{1}{13}$  p. c. gain. *Ans.*
- (52) A does 1 measure per day, and the whole work is 3 such measures. B can do the 3 meas. in  $2\frac{2}{3}$  da., or  $1\frac{1}{3}$  meas. per day. C can do the 3 meas. in  $2\frac{3}{4}$  da., or  $1\frac{1}{4}$  meas. per da.  $\therefore$  A, B, C together, do  $1 + 1\frac{1}{3} + 1\frac{1}{4} = 3\frac{7}{12}$  meas. in a day, or 1 meas. in  $\frac{12}{7}$  da., or the 3 meas. in  $\frac{36}{7}$  of a day. *Ans.*
- (53) 120d. credit = 100d. cash, or 1s. credit = 10d. cash,  
 or 26s. credit = 260d. cash = 21s. 8d. *Ans.*
- (54)  $\left. \begin{array}{l} 6 : 4 \text{ m.} \\ 21 : 35 \text{ da.} \\ 12 : 10 \text{ hrs.} \end{array} \right\} :: \pounds 20 : \pounds \frac{500}{27} = \pounds 18 \text{ 10s. } 4\frac{4}{9}\text{d. } \textit{Ans.}$
- (55) The length and breadth excluding the path are 30 ft. and 10 ft.  
 Now, 45 bricks pave 9 sq. ft.,  $\therefore$  5 bricks pave 1 sq. ft.; and  
 $30 \times 10 \times 5 = 1500$  bricks. *Ans.*
- (56)  $3\frac{1}{2}$ s. =  $\frac{1}{3}$  of a guin. =  $\frac{1 \times 11}{6 \times 5}$  of  $\frac{5}{11}$  guin.; and  $\frac{11}{30} = .36$ . *Ans.*  
 $.232 \text{ cwt.} \times 112 \text{ \&c.} = 25 \text{ lbs. } 15 \text{ oz. } 11.904 \text{ drs. } \textit{Ans.}$   
 $4.0171 \text{ mile} = \frac{401.71}{100} \text{ mi.} = 401\frac{71}{100} \times \frac{1}{100} = 4 \text{ mi. } 30\frac{3}{4} \text{ yds. } \textit{Ans.}$

- (57) Interest on £100, for 2 mths. and 3 mths., at 4 p. c. per ann., = £ $\frac{2}{3}$  and £1, respectively; therefore, the present worths of the bills =  $\left(\frac{100}{100\frac{2}{3}} + \frac{100}{101}\right)$  of £151 = £151  $\times \frac{30250}{151 \times 101}$  = £30250  $\div$  101 = £299 $\frac{51}{101}$ ; to which add cash £3750, making the amount £4049 $\frac{51}{101}$ . The eldest son taking  $\frac{1}{4}$  of this, gives  $\frac{1}{4}$  of the remaining  $\frac{3}{4}$ , viz.  $\frac{3}{16}$  of the whole to each of his brothers; =  $\frac{1}{16}$  of £12148 $\frac{52}{101}$  = £759 $\frac{57}{202}$  = £759 5s. 7 $\frac{73}{101}$ d. *Ans.*

- (58)  $\sqrt{39\cdot06,25} = 6\cdot25$ . *Ans.*

$$\sqrt{2116\cdot874,304} = 12\cdot84. \quad \text{Ans.}$$

		1728
368	43200	388874
	2944	369152
	46144	19722304
3844	4915200	19722304
	15376	
	4930576	

- (59)  $\frac{76978}{77}$  cents at £3 $\frac{1}{2}$  =  $\frac{76978}{22}$  = £3499. *Ans.*

$$\text{The gain is } £\frac{7}{8} \text{ on every } £77 = \frac{76978 \times 7}{77 \times 8} = £874 \text{ 15s. } \text{Ans.}$$

- (60) The no. of poles cut off  $\times 15\frac{1}{2}$  will be = 1 ac. = 160 sq. po.  
 $\therefore 160 \div 15\frac{1}{2}$  = the length in poles =  $320 \div 31 = 10\frac{10}{31}$  po. *Ans.*

- (61) No. of yds. in a degree =  $69\frac{1}{22} \times 1760 = 121520$  yds.  
 35 yds. = 32 metres,  $\therefore$  1 yd. =  $\frac{32}{35}$  metre;  
 $\therefore 121520$  yds. =  $\frac{32 \times 121520}{35}$  met. = 111104 met. *Ans.*

- (62)  $10\frac{1}{3}$  ft. =  $\frac{31}{9}$  yds.;  $\therefore 9\frac{3}{4}$ d.  $\times 24 \times \frac{31}{9}$  =  $26d. \times 31 = 67s. 2d.$  *Ans.*

- (63)  $\sqrt[3]{\frac{2}{3}} = \sqrt[3]{\cdot666,666}$  &c. =  $\cdot8736-$ ;  
 $\sqrt[3]{\frac{2}{3}} = \sqrt[3]{\cdot66,666,66}$  &c. =  $\cdot8165-$ ;  
 $\cdot0571$  *Ans.*

- (64)  $\frac{10000}{100}$  cents @ £3 = £300, first income;  
 $\frac{10000}{100}$  cents @ 92 = £9200;  
 $\frac{9200}{110}$  cents @ £4 = £334 $\frac{6}{11}$ , second income;  
 hence, there is an increase of £34 $\frac{6}{11}$ . *Ans.*

- (65)  $\sqrt{69,02,28\cdot64} = 830\cdot8$ . *Ans.*       $\sqrt{1,860,867} = 123$ . *Ans.*



- (77) The question proposes to find the rate per cent. per ann., at which  
 $\pounds 247$  1s. 8d. produces  $\pounds 4$  18s. 10d. int. in 4 mths.  
 $\pounds 4$  18s. 10d. in 4 mths. =  $\pounds 14$  16s. 6d. for 12 mths.  
 $\pounds 247$  1s. 8d. : 100 ::  $\pounds 14$  16s. 6d. : 6. *Ans.*
- (78)  $\sqrt{5,33\cdot61} = 23\cdot1$ . *Ans.*  $\sqrt{1771561} = 121$ . *Ans.*  
 $\sqrt{\frac{289}{9}} = \frac{17}{3} = 5\frac{2}{3}$ . *Ans.* 

$$\begin{array}{r} 1728 \\ 361 \overline{) 43200} \overline{) 43561} \\ \underline{361} \phantom{00} \overline{) 43561} \\ \underline{43561} \\ 0 \end{array}$$
- (79)  $93\frac{1}{2} + \frac{1}{8}$ , or  $\pounds 93\frac{5}{8}$ , purchases  $\pounds 100$  stock;  
 $93\frac{5}{8} : 540 :: \pounds 100 : \pounds 578\frac{2}{3}$ . *Ans.*
- (80) 5 ox. = 7 hor.,  $\therefore 1$  ox. =  $1\frac{4}{5}$  hor.,  $\therefore 2$  ox. =  $2\frac{3}{5}$  hor.;  
 $\therefore 2$  ox. + 3 hor. =  $5\frac{3}{5}$  hor.  
 $5\frac{3}{5}$  hor. : 7 hor. :: 87 da. : 105 da. *Ans.*
- (81)  $\pounds 3$  13s. 6d. + 2 = 36s. 9d., the share of 21 men;  
 $36$ s. 9d. + 21 = 1s. 9d. to each man  
 $1$ s. 9d. + 3 = 0s. 7d. to each child  
 $\therefore 1$ s. 2d. to each wom. } *Ans.*
- (82)  $4\frac{1}{2}$ s.  $\times 133 \times \frac{1}{2} \times \frac{3}{7} \times \frac{7}{19} \times \frac{3}{4} \times \frac{1}{8}$   
 $= \frac{9}{2}$ s.  $\times 7 \times \frac{3}{2} \times \frac{3}{32} = \frac{567}{128}$ s. = 4s.  $5\frac{5}{32}$ d. *Ans.*
- (83) Circumference = 3·14159 yds.;  $\therefore 1760$  yds. + 3·14159  
 $= 176000000 + 314159 = 560\cdot226$ —yds. *Ans.*
- (84) A supplies 1 measure per minute, and the content of the cistern is 4 such measures; of which B supplies  $\frac{2}{3}$  meas., and C discharges  $1\frac{2}{3}$  meas. per min.  
When C is opened, A and B have supplied 3 meas.; +  $\frac{2}{3}$  meas.; then,  $4 - 3\frac{2}{3} = \frac{1}{3}$  meas. to be supplied, at the rate of  $1 + \frac{2}{3} - 1\frac{2}{3}$ , or  $\frac{2}{3}$  meas. per min.; hence the cistern would now be filled in  $\frac{1}{\frac{2}{3}} = 1\frac{1}{2}$  min. *Ans.*  
 $3\frac{4}{5}$  meas. = 361 gal.;  $\therefore \frac{1}{5}$  meas. = 19 gal.; or 1 meas. = 95 gal.  
In  $4\frac{1}{2}$  min. A supplies  $4\frac{1}{2}$  meas. =  $427\frac{1}{2}$  gal.  
In  $2\frac{1}{2}$  min. B supplies 2 meas. = 190 gal. } *Ans.*
- (85)  $\frac{27225}{97\frac{2}{3}}$  cents at  $\pounds 3\frac{1}{4} = \frac{27225 \times 13}{390} = \pounds 907$  10s. *Ans.*

$$(86) \quad \frac{15}{16} - \frac{14}{15} + \frac{13}{14} - \frac{11}{12} = \frac{105 + 104}{112} - \frac{56 + 55}{60},$$

$$= \frac{209}{112} - \frac{37}{20} = \frac{1045 - 1036}{560} = \frac{9}{560}. \quad \text{Ans.}$$

$$\frac{3}{8} \text{ of } 21s. + \frac{3}{16} \text{ of } 5s. + \frac{3}{10} \text{ of } 7\frac{1}{2}s. =$$

$$7.875s. + .9375s. + 2.25s. = 11.0625s.;$$

$$\text{which } \div 16s. \text{ gives } .69140625. \quad \text{Ans.}$$

$$(87) \quad £325\frac{5}{8} \times \frac{9}{2} \times \frac{5}{12} \times \frac{1}{100} = £\frac{391}{64} = £6 \text{ } 2s. \text{ } 2\frac{1}{2}d. \quad \text{Ans.}$$

$$(88) \quad \left. \begin{array}{l} 18 : 45 \text{ m.} \\ 3 : 27 \text{ da.} \\ 54 : 45s. \end{array} \right\} :: 16s. : \frac{16s. \times 45 \times 9 \times 45}{18 \times 54} = £15. \quad \text{Ans.}$$

$$(89) \quad \text{Circuit of room} = (21 \text{ ft. } 9\frac{1}{8} \text{ in.} + 15 \text{ ft. } 7 \text{ in.}) \times 2 = 74\frac{3}{4} \text{ ft.};$$

$$\therefore 74\frac{3}{4} \times 8\frac{1}{8} \text{ sq. ft. of paper required; and the width being } 22\frac{1}{2} \text{ in.}$$

$$\text{or } 1\frac{7}{8} \text{ ft., we have}$$

$$(74\frac{3}{4} \times 8\frac{1}{8}) \div 1\frac{7}{8} = 299 \times 65 \div 60$$

$$= 323\frac{11}{12} \text{ ft.} = 107\frac{35}{36} \text{ yds., length of paper required.} \quad \text{Ans.}$$

$$(90) \quad \frac{845}{4}d. \times \frac{3642}{100} = \frac{169}{2}d. \times \frac{1821}{20}$$

$$= 307749d. \div 40 = £32 \text{ } 1s. \text{ } 1\frac{29}{40}. \quad \text{Ans.}$$

$$120d. \times \frac{17}{18} \times \frac{9}{10} \times \frac{5}{6} = 85d.$$

$$861d. \times \frac{2}{3} \times \frac{1}{7} = 82$$

$$\underline{3d.} \quad \text{Ans.}$$

$$(91) \quad \text{As the latter rate of income is } \frac{3\frac{1}{2}}{3} \text{ or } 1\frac{1}{6} \text{ of the former, so should}$$

$$\text{the price of the latter stock be } 1\frac{1}{6} \text{ of } 85\frac{1}{8} = 99\frac{5}{16}. \quad \text{Ans.}$$

$$85\frac{1}{8} : 5000 :: £3 : £176 \text{ } 4s. \text{ } 2\frac{179}{224}d. \quad \text{Ans.}$$

$$(92) \quad 2 \text{ years' rent} = £184 \text{ } 0s. \text{ } 0d.$$

$$\text{Int. on 1 yr's rent} \quad \underline{4 \text{ } 12 \text{ } 0}$$

$$£188 \text{ } 12s. \text{ } 0d.$$

$$\frac{1}{2} + \frac{1}{3} \text{ of } \frac{1}{4} = \frac{1}{6}$$

$$= £62 \text{ } 17s. \text{ } 4d.$$

$$\text{Other expenses} \quad \underline{2 \text{ } 3 \text{ } 4}$$

$$65 \text{ } 0s. \text{ } 8d.$$

$$\text{Balance, } \underline{£123 \text{ } 11s. \text{ } 4d.} \quad \text{Ans.}$$

$$(93) \quad \text{Circuit of room} = (19 \text{ ft. } 10\frac{1}{4} \text{ in.} + 16 \text{ ft. } 1\frac{3}{4} \text{ in.}) \times 2 = 72 \text{ ft.}$$

$$\text{Surface to be painted} = 72 \text{ sq. ft.} \times 10\frac{1}{4} = 738 \text{ sq. ft.}$$

$$= 82 \text{ sq. yds. } @ \text{ } 9\frac{1}{2}d. = £3 \text{ } 4s. \text{ } 11d. \quad \text{Ans.}$$

$$(94) \quad 1618\frac{1}{2} \div 69\frac{1}{2} = 3237 \div 139\frac{1}{11} = 35607 \div 1519 = 23\frac{579}{1519} \text{ deg.} \quad \text{Ans.}$$



$$\frac{5}{7} \text{ of } £2 \text{ } 7s. \text{ } 8\frac{1}{2}d. = £1 \text{ } 14s. \text{ } 0\frac{3}{4}d. \quad \text{Ans.}$$

$$\frac{3}{10} \text{ of } £1 \text{ } 6s. \text{ } 8d. = £0 \text{ } 8s. \text{ } 0d. \quad \text{Ans.}$$

$$\underline{£1 \text{ } 6s. \text{ } 0\frac{3}{4}d.}$$

$$\frac{3}{4}d. = .75d. = .0625s.; \quad 6.0625s. = £.303125;$$

$$\therefore £1 \text{ } 6s. \text{ } 0\frac{3}{4}d. = 1.303125 \text{ of } £1 \\ = .06515625 \text{ of } £20. \quad \text{Ans.}$$

$$(95) \quad 26)33 \text{ lbs. } 3 \text{ oz. } 11 \text{ dwt. } 14 \text{ grs.}$$

$$\quad \quad \quad 1 \text{ lb. } 3 \text{ oz. } 7 \text{ dwt. } 8\frac{11}{13} \text{ grs.} \quad \text{Ans.}$$

$$3\frac{3}{4} \text{ guin. } \times 399\frac{139}{240} \text{ oz.} = 1498\frac{27}{84} \text{ guin.} \quad \text{Ans.}$$

$$(96) \quad 10798 : 150 :: 463 : 6\frac{2331}{339} \text{ ft.} \quad \text{Ans.}$$

$$(97) \quad \text{Amount of dividends, } \frac{4410}{70} \text{ cents at } 3\frac{1}{2} \times 5 = £1102 \text{ } 10s.$$

$$\text{Sold out } \frac{4410}{70} \text{ cents at } £5 \text{ profit} \quad . \quad . \quad . \quad 315 \quad 0 \\ \underline{£1417 \text{ } 10s.}$$

$$5 \text{ p. c. on mortgage, for 5 yrs.}$$

$$= \frac{25}{100} \text{ or } \frac{1}{4} \text{ of } £4410 \quad . \quad . \quad . \quad . \quad . \quad . \quad 1102 \text{ } 10$$

$$\text{Gain on the whole, } \underline{£315 \text{ } 0s.} \quad \text{Ans.}$$

$$(98) \quad \text{Int. on } 100 = 4\frac{1}{2} \times \frac{5}{12} = 1\frac{7}{8};$$

$$\therefore 100 \text{ is the present worth of } 101\frac{7}{8}, \text{ or } 800 \text{ is the present worth of } 815, \text{ or } 160 \text{ of } 163;$$

$$\therefore \frac{160}{163} \text{ of } £325 \text{ } 16s. \text{ } 8d. = £319 \text{ } 16s. \text{ } 8\frac{120}{163}d. \quad \text{Ans.}$$

$$(99) \quad \sqrt{53,14,41} = 729. \quad \text{Ans.} \quad \sqrt{11,95,50'66,91,21} = 345.761. \quad \text{Ans.}$$

$$\mathcal{N}^{\circ}000,328,509 = .069. \quad \text{Ans.}$$

$$\mathcal{N}^{\circ}27,054'036,008 = 30.02. \quad \text{Ans.}$$

$$\begin{array}{r} 27 \\ 9002 \quad 27000000 \quad | \quad 054036008 \\ \underline{18004} \quad \quad \quad | \quad \underline{54036008} \\ 27018004 \end{array}$$

$$(100) \quad \left. \begin{array}{l} 37 : 20 \text{ m.} \\ 7 : 13 \text{ fie.} \\ 130 : 90 \text{ yds.} \\ 150 : 129\frac{1}{2} \text{ yds.} \end{array} \right\} :: 3\frac{1}{4} \text{ da.} : \frac{13 \times 5 \times 13 \times 45 \times 259}{37 \times 7 \times 130 \times 150} \\ = 13 \times 3 + 20 = 1\frac{12}{20} \text{ day.} \quad \text{Ans.}$$

$$(101) \quad 1 \text{ wom.} = 1\frac{2}{3} \text{ ch.; also, } 1 \text{ man} = 2\frac{2}{3} \text{ wom.} = 2\frac{2}{3} \text{ ch.} \\ \therefore 2 \text{ men} + 3 \text{ wom.} + 4 \text{ ch.} = 5\frac{1}{3} \text{ ch.} + 4\frac{4}{3} \text{ ch.} + 4 \text{ ch.} = 14\frac{2}{13} \text{ ch.}$$

$$14\frac{2}{13} : 8 :: 26\frac{1}{2} \text{ hrs.} : \frac{53 \times 60}{212} = 15 \text{ hrs.} \quad \text{Ans.}$$

- (102)  $162 \div 27 = 6$  hrs.;  $121 + 9\frac{1}{2} = 121\frac{14}{10}$  hrs.;  $27 \div 8 = 3\frac{3}{8}$  hrs.  
 $6 + 121\frac{14}{10} + 3\frac{3}{8} = 22\frac{17}{152}$  hrs. = 12 hrs. + 10 hrs. 6 min.  $42\frac{13}{19}$  sec.  
 1 hr. 47 min. + 10 hrs. 6 min.  $42\frac{13}{19}$  sec. = 11 hrs. 53 min.  $42\frac{13}{19}$  sec.  
 past midnight; which is 6 min.  $17\frac{7}{19}$  sec. before noon of the following day. *Ans.*

(103)  $86\frac{1}{4}$  sq. ft.  $\times 62\frac{1}{2} + 9 = \frac{3457 \times 125}{72}$  sq. yds. =  $6001\frac{53}{72}$  sq. yds. *Ans.*

(104) B's proportion is  $\frac{3}{28}$ , and C's is  $\frac{3}{5}$  of  $\frac{25}{28}$ , or  $\frac{15}{28}$ .  
 Now,  $\frac{1}{28}$  of 27s.  $\times \frac{77}{540} \times \frac{75 \times 2}{15 \times 7} \times \frac{40 \times 7}{30 \times 11} = \frac{1}{8}$ s. = 2d.  
 $\therefore$  B's  $\frac{3}{28} = 2d. \times 3 = 0s. 6d.$   
 C's  $\frac{15}{28} = 2d. \times 15 = 2s. 6d.$  } *Ans.*

- (105) Int. on 100 =  $4\frac{1}{4} \times 3 = 13\frac{1}{2}$ ;  $\therefore$  100 is the present worth of  $113\frac{1}{2}$ ;  
 or 200 the present worth of 227.

$\frac{200}{227}$  of  $\frac{2295}{2} = £1011\frac{9}{227} = \text{Ans.}$

(106) A,  $2000 \times 8 + 3000 \times 4 = 28000$   
 B,  $750 \times 4 + 3750 \times 3 + 2450 \times 5 = 26500$   
 $\quad \quad \quad 54500$   
 $\therefore$  A's share of profit =  $\frac{280}{545}$  of £1635 = £840  
 B's,  $1635 - 840 = £795$  } *Ans.*

- (107)  $7000 \text{ grs.} \div 32 = 218\frac{3}{8}$  grs. in 1 hf. penny;  
 $5760 \text{ grs.} \div 44\frac{1}{2} = 129\frac{39}{88}$  grs. in 1 guinea;  
 Difference,  $\frac{89\frac{111}{888}}$  grs. *Ans.*

(108) £2 : £21 :: £100 : £1050. *Ans.*

(109)  $(154 \times 20 \times 12) \div 3\frac{1}{2} = 44 \times 20 \times 12 = £10560.$  *Ans.*

(110) Original int. =  $\frac{3\frac{1}{2}}{100}$  or  $\frac{7}{200}$  of £18752 = £656.32  
 $\quad \quad \quad 27$  spent in excess of interest.

$\begin{array}{r} 656.32 \\ \text{Int. } 655.375 \\ 27 + \quad 0.945 \\ \hline 656.32 \end{array} = \begin{array}{l} 27.945 \text{ spent over interest.} \\ 18697.055 \text{ remainder, 2nd yr.} \end{array}$   
 $\begin{array}{r} 656.32 \\ \text{Int. } 654.396325 \\ 27 + \quad 1.923675 \\ \hline 656.32 \end{array} = \begin{array}{l} 28.923675 \text{ spent over interest.} \\ £18668.131325 \text{ remainder, 3rd yr.} \\ = £18668 \quad 2s. 7\frac{331}{800}d. \text{ Ans.} \end{array}$

- (111) 5 p. c. per annum for 20 yrs. is 100 per cent.; so that the money doubles itself every 20 yrs.; and, therefore, we have to find how often 100 can be multiplied successively by 2, so that the product may not exceed 1000. Now,  $1000 \div 100 = 10$ ; and the highest power of 2 contained in 10 is  $2^3 = 8$ ; hence,  
 $\pounds 100 \times 8 = \pounds 800$ , amount in 3 periods, each 20 yrs.  
 $1000 - 800 = \pounds 200 = \text{int. of } \pounds 800 \text{ for 5 yrs.}$   
 $\therefore 3 \text{ times } 20 + 5 = 65 \text{ yrs. } \textit{Ans.}$
- (112) 10 p. c. or  $\frac{1}{10}$  of  $\pounds 25 = \pounds 2 \text{ } 10\text{s.}$ ;  $\therefore$  the 40 gals. are to be sold for  $\pounds 27 \text{ } 10\text{s.}$ ; which is at 13s. 9d. a gal. *Ans.*
- (113) 5 qrs. at 60s. + 3 qrs. at 54s. =  $300 + 162 = 462\text{s.}$ ;  
 $462\text{s.} \times \frac{32}{33} = 448\text{s.} = \pounds 22 \text{ } 8\text{s.} \textit{Ans.}$
- (114)  $\left. \begin{array}{l} \pounds 30 : 20 \text{ mi.} \\ \pounds 14\frac{1}{2} : \pounds 5\frac{7}{16} \end{array} \right\} :: 60 \text{ cwt.} : \frac{15 \text{ cwt.} \times 5 \times 87}{15 \times 29} = 15 \text{ cwt. } \textit{Ans.}$
- (115) 14 sq. ft. 11 in. = 2027 sq. in.  
 $\sqrt{20,27} = 45.0222167 \text{ lineal in.} = 3 \text{ ft. } 9.02222 \text{ in. } \textit{Ans.}$
- (116) A's outlay : B's :: 1158s. : 594s., or 579 : 297;  
 or A's outlay was  $\frac{579}{876}$ , and B's  $\frac{297}{876}$ , of the whole;  
 $\therefore \frac{579 - 297}{876}$  or  $\frac{282}{876}$  of whole outlay =  $\pounds 7\frac{5}{8}$ ;  
 $282 : 579 :: \pounds 7\frac{5}{8} : \pounds \frac{1}{8} \times 579 + 6$   
 $= \pounds 193 \div 12 = \pounds 16 \text{ } 1\text{s. } 8\text{d. A.}$   
 $\pounds 7 \text{ } 16\text{s. } 8\text{d. less} = 8 \text{ } 5 \text{ } 0 \text{ B. } \textit{Ans.}$
- (117) 29.50 cents. at  $\pounds 3 = \pounds 88 \text{ } 10\text{s.}$ , first income;  
 22.5 cents sold at  $75\frac{1}{4}$  produced  $\pounds \frac{59 \times 301}{8}$ ;  
 $\frac{59 \times 301}{8 \times 110\frac{5}{8}}$  Russian cents at  $\pounds 5 = \pounds \frac{59 \times 301}{385}$   
 $= \pounds 100 \text{ } 6\text{s. } 8\text{d.}$ , second income;  
 $\frac{88 \text{ } 10 \text{ } 0}{\text{An increase of } \pounds 11 \text{ } 16\text{s. } 8\text{d. } \textit{Ans.}}$
- (118)  $\sqrt{\frac{225}{169}} = \frac{15}{13} = 1\frac{2}{13} \textit{Ans.}$   
 $\sqrt{11,95,50,66,91,21} = 345761 \textit{Ans.}$   
 $\sqrt{1953,125} = 125 \textit{Ans.}$   
 $\begin{array}{r} 1728 \\ 365 \quad 43200 \overline{) 225125} \\ \underline{1825} \quad 225125 \\ \underline{45025} \end{array}$
- (119) 42 sh. = 7 ox.;  $\therefore 3 \text{ sh.} = \frac{1}{2} \text{ ox.} = \pounds 10$ ;  
 hence 1 ox. =  $\pounds 20$ , or 100 ox. =  $\pounds 2000 \textit{Ans.}$

- (120) 4 lbs. at 3s. + 7 lbs. at 4s. = 40s.

11 lbs. at 3s. 9d. =  $41\frac{1}{2}$ s.;  $\therefore$  gain on 40s. =  $1\frac{1}{2}$ s.40s. : 100 ::  $1\frac{1}{2}$ s. :  $3\frac{1}{8}$  p. c. *Ans.*

- (121) Amt. of £1 for 3 yrs. at
- $4\frac{1}{2}$
- p. c.

is by compound interest =  $\left(1 + \frac{4\frac{1}{2}}{100}\right)^3 = \left(\frac{209}{200}\right)^3$ ,and by simple interest =  $1 + \frac{13\frac{1}{2}}{100} = \frac{227}{200}$ ;difference =  $(9129329 - 9080000) \div 8000000$ ; $\therefore \frac{\pounds 49329 \times 150}{8000000} = \frac{49329s. \times 3}{8000} = 18s. \frac{5196\frac{1}{2}}{8000}d.$  *Ans.*

- (122)
- $\left. \begin{array}{l} 7 : 5 \text{ m.} \\ 800 : 1800 \text{ ft.} \\ 700 : 960 \text{ ft.} \\ 12 : 14 \text{ hrs.} \end{array} \right\} :: 3\frac{1}{2} \text{ da.} : \frac{7 \times 5 \times 900 \times 960 \times 14}{7 \times 800 \times 700 \times 12}$

~~12 da.~~ *Ans. = 9 da.*

- (123) A has
- $\frac{4}{5}$
- of B's no., and C has
- $\frac{7}{8}$
- of A's no. =
- $\frac{7}{8}$
- of
- $\frac{4}{5}$
- of B's;
- 
- hence the nos. of A, B, C are as
- $\frac{3}{5}$
- , 1, and
- $\frac{7}{5}$
- of
- $\frac{4}{5}$
- ;
- 
- or as 12, 9, and 14; sum 35; hence
- $770 \div 35 = 22$
- ;
- 
- which
- $\times$
- the proportional nos. gives 264, 198, 308.
- Ans.*

- (124)
- $\left. \begin{array}{l} \pounds 12 : \pounds 6\frac{3}{4} \\ 4\frac{1}{2} : 24 \text{ mo.} \end{array} \right\} :: \pounds 100 : \frac{100 \times 27 \times 6}{6 \times 9} = \pounds 300.$
- Ans.*

- (125) 25 cents at 48 = £1200

8 cents at 99 =  $\frac{792}{1992}$ 

1992

 $\frac{1992}{93\frac{3}{8}}$  cents in the Consols =  $\frac{1992 \times 800}{747} = \pounds 2133\frac{1}{3}.$  *Ans.*

- (126) 56 ac. @ £81 3s. 6d. = £4545 16s. 0d.

67 @ 92 4 8 6179 12 8

71 @ 109 3 2 7750 4 10

15 p. c. =  $\frac{15}{100} = \frac{3}{20}$  of £18475 13 6

3

20)55427 0 6

£2771 7s. 0 $\frac{3}{4}$ d. *Ans.*

- (127)
- $\left. \begin{array}{l} 144 : 80 \text{ sq. in.} \\ 8\frac{1}{2} : 20 \text{ cwt.} \end{array} \right\} :: 5\frac{1}{2} \text{ ft.} : \frac{11 \times 40 \times 20}{36 \times 33}$
- 
- = 200 ft. + 27 = 7 ft.
- $4\frac{8}{9}$
- in.
- Ans.*

- (128) When A has given B
- $\frac{19}{58}$
- of
- $\frac{32}{174}$
- of
- $(18s. - 12s.) = 6d.$
- ,
- 
- then A has
- $18s. - 6d.$
- , or
- $17s. 6d.$
- , and B has
- $12s. 6d.$
- 
- $17s. 6d. \times 2\frac{1}{2} \times \frac{1}{3} = 6s. 3d.$
- 
- $12s. 6d. \times \frac{1}{3} \times \frac{1}{18} = 4s. 7d.$

C's money is =  $10s. 10d. \times 1\frac{1}{2} = 16s. 3d.$  *Ans.*

- (129) No. of sq. yds. of carpet =  $28 \times 19 \div 9$ ,  
 Length of carpet bought =  $\frac{28 \times 19}{9 \times \frac{3}{4}}$  yds.  
 $\therefore$  cost =  $\frac{69d. \times 28 \times 19 \times 4}{9 \times 3} = £22 \ 13s. \ 2\frac{2}{3}d.$  *Ans.*
- (130) First income = 20 cents at  $£3\frac{1}{2} = £70$ ;  
 20 cents sold out at 99 = £1980;  
 Second income =  $\frac{1980}{86\frac{5}{8}}$  cents at  $£3 = \frac{480}{7} = £68\frac{4}{7}$ ;  
 $£70 - £68\frac{4}{7} = £1\frac{3}{7}$  decrease. = *Ans.*
- (131)  $£2 \ 16s. \ 10\frac{3}{4}d. \times 14433 + 100$   
 $\frac{14433}{100} 41058 \ 17 \ 6\frac{3}{4}$   
 $£410 \ 11s. \ 9\frac{123}{100}d.$  *Ans.*  
 $£9753 \ 14s. \ 8\frac{1}{2}d. \div 234\frac{1}{2} = £19507 \ 9s. \ 4\frac{1}{2}d. + 469,$   
 $= £41 \ 11s. \ 10\frac{3}{4}d.$  *Ans.*
- (132)  $£3\frac{3}{4} : £3228 \ 3s. \ 4d. :: £100 : \frac{100 \times 3228\frac{1}{8}}{8\frac{3}{4}}$   
 $= \frac{400 \times 19369}{35 \times 6} = £36893 \ 6s. \ 8d.$  *Ans.*
- (133)  $\frac{5\frac{1}{3}s. \times 15 \times 11\frac{1}{4} \times 60}{144} = \frac{16 \times 5 \times 45 \times 15}{144} = 375s. = £18 \ 15s.$  *Ans.*
- (134) 3 lbs. of sugar and 1 lb. tea cost  $72d.$   
 10 p. c. on S. along with 10 p. c. on T. =  $\frac{1}{10}$  of  $72d. = 7\frac{1}{5}d.$   
 $79\frac{1}{5}d.$   
 $\therefore$  40 p. c. on S. must be =  $84d. - 79\frac{1}{5}d.$ , or  $4\frac{4}{5}d.$   
 $40 : 4\frac{4}{5}d. :: 100 : 12d. = 1s.$  cost of the sugar  
 $6 - 1 = 5s.$  cost of the tea } *Ans.*
- (135) Bought 14 sheep for  $£39 \ 6s. \ 5\frac{1}{2}d.$   
 $4 \text{ p. c.} = \frac{1}{25} = \frac{1 \ 11 \ 5\frac{1}{2}}{40 \ 17 \ 11}$   
 Sold 6 at  $£1 \ 16s. = \frac{10 \ 16 \ 0}{£30 \ 1s. \ 11d.}$   
 8 to be sold for  $£30 \ 1s. \ 11d.$   
 which is at  $£3 \ 15s. \ 2\frac{1}{8}d.$  each. *Ans.*
- (136) If 11·324 represents the weight of 1 cub. in. of lead,  
 then 240 " " " 1 cub. in. of cork;  
 $\therefore 11\cdot324 \times 60 + 24 \times 54 = 692\cdot4$ , represents the  
 weight of 1538 $\frac{2}{3}$  cub. in. of fir.  
 $\therefore 692\cdot4 \div 1538\frac{2}{3} = 2077\cdot2 \div 4616 = \cdot45$ , the comparative  
 weight of 1 cub. in. of fir. *Ans.*

- (137)  $10s. : 12\frac{1}{2}s. :: 95 : 118\frac{3}{4}$ , or  $18\frac{3}{4}$  p. c. gain } *Ans.*  
 $95 : 10s. :: 100 : 10s. 6\frac{6}{19}d.$  prime cost }

*Otherwise:*

Articles that cost 100s. were sold for 95s.;  $\therefore 95s. + 10s.$   
 $= 9\frac{1}{2}$  is the no. of articles that cost 100s.  
 Then, if  $9\frac{1}{2}$  articles were sold at  $12\frac{1}{2}s.$ , the amount would  
 be  $118\frac{3}{4}s.$ , showing a gain of  $18\frac{3}{4}$  per cent. *Ans.*  
 Also, prime cost of each article  $= 100s. \div 9\frac{1}{2} = \text{Ans.}$

- (138)  $\begin{array}{r} \text{£}2000 \quad \times .04 = 80 \\ \text{Int.} - 75 = \quad 5 \\ \hline 2005 \quad \times .04 = 80.2 \\ \text{Int.} - 75 = \quad 5.2 \\ \hline 2010.2 \quad \times .04 = 80.408 \\ \text{Int.} - 75 = \quad 5.408 \\ \hline 2015.608 \quad \times .04 = 80.62432 \\ \text{Int.} - 75 = \quad 5.62432 \\ \hline 2021.23232 \times .04 = 80.8492928 \\ \text{Int.} - 75 = \quad 5.8492928 \\ \hline \text{£}2027.0816128 = \text{Ans.} \end{array}$

*Otherwise:*

$$\begin{array}{r} 1.04^5 = 1.2166529024 \\ \quad \quad \quad 2000 \\ \quad \quad \quad 2433.3058048 \\ 75 \times (1.04^5 - 1) + .04 = 406.2241920 \\ \hline \text{£}2027.0816128 = \text{Ans.} \end{array}$$

- (139) The increase is 21549 on 711117, or 1 on 33;  
 $33 : 100 :: 1 : 3\frac{1}{33}$  p. c. *Ans.*

- (140)  $85\frac{1}{2} \times 12\frac{1}{19}$  hrs. :  $15 \times 6$  hrs. ::  $12$  m. :  $\frac{12 \times 90 \times 38}{171 \times 240} = 1$  m. *Ans.*

- (141)  $\begin{array}{r} \text{Good debts} \quad = \text{£}456 \text{ } 18s. \text{ } 1d. \\ \text{£}360 \text{ } 7s. \text{ } 10d. \times \frac{4}{20} = 72 \text{ } 1 \text{ } 6\frac{2}{3} \\ 120 \text{ } 13 \text{ } 0 \times \frac{5}{20} = 30 \text{ } 3 \text{ } 3 \\ 19 \text{ } 18 \text{ } 0 \times \frac{9}{20} = 8 \text{ } 19 \text{ } 1\frac{1}{2} \\ \hline \text{Assets,} \quad \quad \quad \text{£}568 \text{ } 2 \text{ } 0 \text{ } 1 \\ \text{Liabilities,} \quad \text{£}3408 \text{ } 12 \text{ } 0 \text{ } 6 \end{array}$

His assets being  $\frac{1}{6}$  of his liabilities, he can pay  $\frac{1}{6}$  of 20s.  
 $= 3s. \text{ } 4d.$  in the £. *Ans.*

- (142)  $6\frac{2}{5} + 1\frac{2}{5} = (44 \times 9) \div (11 \times 7) = \frac{36}{7}$ ;  
 $\frac{36}{7}$  of  $31\frac{1}{2}s. = 18 \times 63 \div 7 = \text{£}8 \text{ } 2s.$   
 $\text{A £}2 \text{ } 13s. + \text{£}8 \text{ } 2s. = \text{£}10 \text{ } 15s.$   
 B had latterly  $\frac{1}{43}$  of  $\text{£}10 \text{ } 15s. = 5s.$   
 $\therefore \text{B had at first } \text{£}8 \text{ } 2s. + 5s. = \text{£}8 \text{ } 7s. \text{ } \text{Ans.}$

(143)  $\sqrt{100,38,03,61} = 10019$ . *Ans.*  $\sqrt[3]{000,405,224} = 74$ . *Ans.*

100	3803	214	14700	62224
2001	2001		856	62224
20029	180261			
	180261		15556	

$\sqrt[3]{5764801}$ , or  $5764801^{\frac{1}{3}} = 5764801^{\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}}$   
 $\therefore \sqrt[3]{5764801} = 2401$ ;  $\sqrt{2401} = 49$ ;  $\sqrt{49} = 7$ . *Ans.*

(144)  $\frac{1728 \text{ c. in.} \times 294\frac{1}{4} = 588\frac{1}{2} \times 8 = 4708}{13\frac{3}{8} \times 12 \times 6 \times 12 = 107} = 44 \text{ in.} = 3\frac{2}{3} \text{ ft.}$  *Ans.*

Weight of water  $= (294\frac{1}{4} \times 1728 \times 252\frac{1}{2}) \div 7000$   
 $= (3531 \times 12 \times 3030) \div 7000 = 18341\frac{4}{175} \text{ lbs. Av.}$   
 $= 8 \text{ tons } 3 \text{ cwt. } 3 \text{ qrs. } 1\frac{4}{175} \text{ lb.}$  *Ans.*

(145)  $\left. \begin{array}{l} £1 : £100 \\ 5 : 1 \text{ yr.} \end{array} \right\} :: £\frac{1}{20} : 1 \text{ p. c.}$  *Ans.*

(146) Here the bill-broker's charge is supposed to be equivalent to a true discount of 5 p. c. per annum.

Int. on 100 for 2 mths. at 5 p. c.  $= \frac{5}{6}$ .

$100\frac{5}{6} : £600 :: 100 : £\frac{600 \times 120}{121} = £595 \text{ Os. } 9\frac{11}{12}d.$  *Ans.*

(147) I go 27—15, or 12 mi., in the time the coach goes 15, that is, in  $1\frac{1}{2}$  hr.; so that we meet at  $7 + 1\frac{1}{2} = 8 \text{ hrs. } 30 \text{ min.}$ ; and as I have gone 12 mi. in  $1\frac{1}{2}$  hr., I shall go the remaining 15 mi. in  $1\frac{1}{2} \times \frac{15}{12} = 1 \text{ hr. } 52\frac{1}{2} \text{ min.}$ , and therefore arrive at 8 hr. 30 min. + 1 hr.  $52\frac{1}{2} \text{ min.} = 10 \text{ hr. } 22\frac{1}{2} \text{ min.}$  *Ans.*

(148)  $\left. \begin{array}{l} £16 : £72 \\ 10 : 15 \text{ da.} \end{array} \right\} :: 18 \text{ mi.} : \frac{18 \times 72 \times 15}{16 \times 10} = 121\frac{1}{2} \text{ mi.}$  *Ans.*

(149)  $\begin{array}{rcl} 21s. \times \frac{8}{9} \times \frac{3}{5} & = & \frac{56}{5}s. = £0 \text{ } 11s. \text{ } 2\frac{2}{5}d. \\ 20s. \times \frac{8}{9} & = & \frac{80}{9}s. = 0 \text{ } 8 \text{ } 10\frac{2}{3}d. \\ 14\frac{2}{3}s. \times \frac{8}{11} = \frac{4}{3} \times 38 & = & 2 \text{ } 10 \text{ } 8d. \\ \hline & & £3 \text{ } 10s. \text{ } 9\frac{1}{15}d. \end{array}$  *Ans.*

$(1 + 3\frac{1}{2})$  of  $\frac{1}{2}$  a *guin.*  $= \frac{1}{2}$  of a *guin.*  $= 3s.$   
 $(3 + 3\frac{1}{2})$  of  $15\frac{1}{2}s.$   $= \frac{4}{5}$  of  $15\frac{1}{2}s.$   $= 12'4s.$   
 $\begin{array}{r} 20 \overline{) 15'4s.} \\ \underline{15'4s.} \\ £77. \end{array}$  *Ans.*

(150)  $\sqrt{18'40,41} = 4'29$ . *Ans.*  $\sqrt[3]{444,194,947} = 763$ . *Ans.*

- (151)  $6d. \times 12 \times 50 = 300s.$  to the men for 1 day ;  
 $2d. \times 8 \times 35 = 46\frac{2}{3}s.$  to the boys for 1 day ;  
 $346\frac{2}{3}s. \times 5\frac{1}{2} \text{ da.} = 52 \text{ wks.}$   
 $= 346\frac{2}{3}s. \times 11 \times 26 = 99146\frac{2}{3}s. = £4957 \text{ 6s. 8d. } \text{Ans.}$
- (152) 27 sheep are bought for £30 0s.  
 $\frac{2\frac{1}{2}}{100} \text{ or } \frac{1}{40} = 0 \text{ 15s.}$   
 27 sheep must produce  $\frac{30 \text{ 15 } 0}{12 \text{ 18 } 8}$   
 12 already sold for  $\frac{97}{100}$  of  $\frac{1}{40}$  of £30 =  $\frac{12 \text{ 18 } 8}{£17 \text{ 16 } 4}$   
 15 to be sold for  $\frac{£17 \text{ 16 } 4}{\text{or 1 " " } £1 \text{ 3s. 9}\frac{1}{16}\text{d. } \text{Ans.}$
- (153) One gets £3 for every £75 invested ; and we have to find the corresponding investment to produce £3 $\frac{1}{2}$ .  
 $3 : 3\frac{1}{2} :: 75 : 25 \times 3\frac{1}{2} = 87\frac{1}{2}. \text{ Ans.}$
- (154) Int. on 100 for 7 mths.  $= \frac{19}{4} \times \frac{7}{12} = 2\frac{27}{48}$  ; therefore, 100 is the present worth of  $102\frac{27}{48}$  ; or, 4800 the present worth of 4933.  
 $4933 : 54263d. :: 4800 : 4800d. \times 11 = £220$  the pres. worth, *Ans.*,  
 and the discount = £6 1s. 11d. *Ans.*
- (155)  $\frac{£26 \text{ 15s. 5d.}}{3 \times 20} \times \frac{120}{100} = 535s. 5d. + 50 = 1\text{Cs. } 8\frac{1}{2}\text{d. } \text{Ans.}$
- (156) The proposed reciprocals are 1,  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$  ; which, when multiplied by the common denominator, 60, are found to be as 60, 30, 20, 15, 12, and 10 ; sum 147.  
 Accordingly,  $\frac{60}{147}$  of  $(21s. \times 7 + 2) = 30s.$  the 1st part ;  $\frac{1}{2}$  of that is 15s., the 2nd part ;  $\frac{1}{3}$  of it is 10s. &c. *Ans.*
- (157)  $\sqrt{00,13,46,89} = 0367. \text{ Ans.}$   $\sqrt{\frac{9409}{225}} = \frac{97}{15} = 6\frac{7}{15}. \text{ Ans.}$   
 $\sqrt{18,609,625} = 265. \text{ Ans.}$
- (158)  $1 - (\frac{1}{2} + \frac{1}{4} + \frac{1}{8})$  leaves  $\frac{1}{8}$  of the trees = 50 ; therefore, the whole no. is 600. *Ans.*
- (159) Receives at the end of 6 mths. for loan of £100, £2 10s. 0d.  
 Interest on £2 10s. for the next 6 mths.,  $\frac{0 \text{ 1 } 3}{2 \text{ 10 } 0}$   
 Receives at the end of 12 mths.,  $\frac{£5 \text{ 1 } 3}{3 \text{ 10 } 0}$   
 Pays at the end of 12 mths.,  $\frac{£1 \text{ 11s. 3d.}}{£1 \text{ 11s. 3d.}}$   
 Gains on £100 in 12 mths.,  $\frac{£1 \text{ 11s. 3d.}}{£1 \text{ 11s. 3d.}}$   
 $£1 \text{ 11s. 3d.} : £200 :: £100 : £12800. \text{ Ans.}$



- (160) The question may be put thus:—If 5s. 4d. be  $1\frac{1}{3}$  of the prime cost, how much more than the prime cost is 6s.?

$5\frac{1}{3}s. : 6s. :: 1\frac{1}{3} : 1\frac{17}{24}$ , or  $\frac{17}{24}$  more than prime cost ;  
and  $\frac{17}{24}$  of 100 is  $= 26\frac{9}{16}$  p. c. gain. *Ans.*

- (161)  $105 : 100 :: 9\frac{1}{2}d. \times 28 : \frac{19d. \times 40}{3}$  ; which, divided by 57d.

gives,  $\frac{19 \times 40}{3 \times 57} = 40 \div 9$ , or  $4\frac{4}{9}$  lbs. *Ans.*

- (162)  $\frac{729}{1917} = \frac{81 \times 9}{213 \times 9} = \frac{27}{71}$ . *Ans.*

$1'00 \div 256 = '00390625$ . *Ans.*

$$\frac{3}{4} + \frac{7}{10} + \frac{1}{25} + \frac{7}{8} = \frac{150 + 140 + 8 + 175}{200} = \frac{473}{200}$$

$$\therefore 2 + 3 + 1 + 2\frac{73}{200} = 8\frac{73}{200}. \quad \text{Ans.}$$

$$\frac{11}{6} \times \frac{5}{3} \times \frac{13}{5} \times \frac{24}{187} = \frac{13 \times 4}{3 \times 17} = \frac{52}{51} = 1\frac{1}{51}. \quad \text{Ans.}$$

- (163)  $5432 : 169\frac{3}{4} :: 6914 : \frac{6914 \times 679}{5432 \times 4} = \frac{3457}{16} = 216\frac{1}{16}$ . *Ans.*

- (164) Interest on 100 =  $1\frac{1}{4}$  ;  $\therefore$  100 is the present worth of  $101\frac{1}{4}$  ; or  
400 of 405 ; or 80 of 81.

$$\therefore \frac{80}{81} \text{ of } £131\frac{5}{8} = \frac{1055}{8} \times \frac{80}{81} = £130. \quad \text{Ans.}$$

- (165)  $\frac{8\frac{1}{2}d. \times 937\frac{1}{2} \times 66\frac{2}{3}}{9} = \frac{17d. \times 1875 \times 200}{9 \times 12} = 59027\frac{7}{9}d.$   
 $= £245 \text{ } 18s. \text{ } 11\frac{7}{9}d. \quad \text{Ans.}$

- (166)  $\left. \begin{array}{l} 180 : 100 \text{ m.} \\ 8 : 10 \text{ hrs.} \\ 200 : 360 \text{ yds.} \\ 3 : 4 \text{ yds.} \\ 2 : 3 \text{ yds.} \end{array} \right\} :: 6 \text{ da.} : \frac{6 \times 1000 \times 360 \times 4}{180 \times 8 \times 200 \times 2} = 15 \text{ da.} \quad \text{Ans.}$

- (167) The discount is £11 on £240 ;  
 $240 : 100 :: 11 : 4\frac{7}{12}$  p. c. per annum. *Ans.*

Now, if £11 be  $20\frac{5}{8}$  p. c. on what would have been saved annually without the discount, then,

$$20\frac{5}{8} : 11 :: £240 : £53\frac{1}{4}, \text{ the annual saving ;}$$

$$\frac{240}{£293\frac{1}{4}}, \text{ the annual income.} \quad \text{Ans.}$$

- (168) The velocities per minute are  $\frac{186\frac{1}{2}}{16\frac{5}{8} \times 60}$  and  $\frac{196\frac{7}{8}}{18\frac{3}{8} \times 60}$ ;

$$= \frac{2235}{11920} \text{ mi. and } \frac{1575}{8960} \text{ mi.} = \frac{3}{16} \text{ mi. and } \frac{45}{256} \text{ mi.}$$

which are as 48 : 45, or as 16 : 15. *Ans.*

Again, in  $6\frac{3}{4}$  min. the horses would be separated by

$$\frac{48 \times 45}{256} \text{ mi.} \times \frac{27}{4} = \frac{93 \times 27}{1024} \text{ mi.} = 2 \text{ mi. } 795\frac{35}{32} \text{ yds. } \textit{Ans.}$$

- (169)  $\frac{29}{8}$  of  $\frac{11}{5}$  of  $\frac{151}{20}$  of  $\frac{240}{1}d.$  +  $\frac{66}{7}$  of  $\frac{35}{9}$  of  $\frac{12}{1}d.$  +  $\frac{33}{4}$  of  $\frac{33}{8}d.$

$$= 14450\frac{7}{10} + 440 + 34\frac{1}{32} = 14924\frac{117}{160}d. = £62 \text{ } 3s. \text{ } 8\frac{117}{160}d. \textit{Ans.}$$

$$\text{Again, } 3\frac{1}{2}d. \times \frac{3}{8} \times \frac{5}{14} \times \frac{11}{12} = \frac{55}{128}d.$$

$$14924\frac{117}{160}d. + \frac{55}{128}d. = 14924\cdot73125 \times 128 \div 55 \\ = 37433\cdot92. \textit{Ans.}$$

- (170)  $\sqrt{2\cdot05\frac{4}{5}} = \sqrt{(205\frac{4}{5} + 100)} = \sqrt{(1849 + 900)}$

$$= 43 + 30 = 1\cdot43. \textit{Ans.}$$

$$\sqrt{42\cdot0336\frac{1}{5}} = \sqrt{(420336\frac{1}{5} + 10000)}$$

$$= \sqrt{(3783025 + 90000)} = 1945 + 300 = 6\cdot483. \textit{Ans.}$$

$$\sqrt{15\cdot438,249} = 2\cdot49. \textit{Ans.} \quad \sqrt{629\cdot422,793} = 8\cdot57. \textit{Ans.}$$

- (171) 24 hrs. : 308 × 16 hrs. ::  $\frac{6000}{2240}$  tons :  $\frac{6000 \times 22 \times 16}{160 \times 24}$  tons

$$= 50 \times 11 = 550 \text{ tons. } \textit{Ans.}$$

$$308 \text{ da.} : 6 \text{ da.} :: 63s. \times 550 : 9s. \times 75$$

$$= £33 \text{ } 15s. \text{ weekly returns;}$$

$$\frac{20}{0}$$

$$£13 \text{ } 15s. \text{ gain per week;}$$

$$20 : 100 :: 13\frac{3}{4} : 68\frac{3}{4} \text{ p. c. } \textit{Ans.}$$

- (172) 100s. : 15s. :: 21 $\frac{1}{2}$ s. : 3s. 2 $\frac{1}{2}$ d. gain, or loss;  
15s. + 3s. 2 $\frac{1}{2}$ d. = 18s. 2 $\frac{1}{2}$ d. and 11s. 9 $\frac{3}{4}$ d. *Ans*

- (173) The value of silver *equal in weight* to gold worth £1750  
is £1750 ÷ 14 = £125;  
the value of silver *equal in bulk* to gold worth £1750  
is  $\frac{10}{19}$  of £125 = £65 15s. 9 $\frac{9}{16}$ d.

- (174) No. of stones = 1760 × 112 × 4 at 127 $\frac{3}{4}$ d. = 511d. × 19712  
= 100728320d. = £419701 6s. 8d. *Ans.*

- (175) 22 oz. at 5s. = £5 10s. 0d.

$$12\frac{1}{2} \text{ dwt. or } \frac{49}{80} \text{ oz. cost } \frac{49}{80} \text{ of } 5s. = 0 \text{ } 3 \text{ } 0\frac{3}{4}$$

$$\cdot \quad \underline{\underline{£5 \text{ } 13s. \text{ } 0\frac{3}{4}d.}} \textit{Ans.}$$

- (176)  $\sqrt[3]{2460375} = 135$ ;  $\sqrt[3]{4096} = 16$ ;  
 $\sqrt[3]{50625} = \sqrt{225} = 15$ ;  $\therefore \frac{135}{16} + 15 = \frac{9}{16}$ . *Ans.*
- (177) 2 wks. 2 da.  $19\frac{1}{2}$  hrs.  $= 16\frac{96}{120}$  da.  $= 16\frac{4}{5}$  da.  
 $16\frac{4}{5}$  da.  $\div 28$  da.  $= 84 \div (28 \times 5) = \frac{3}{5}$  mth. *Ans.*  
 $\frac{13}{18}$  of  $\mathcal{L}\frac{1}{20} = \mathcal{L}05 \times 13 + 16 = \mathcal{L}040625$   
 $\frac{6}{8}$  of  $\mathcal{L}\frac{1}{8} = \mathcal{L}125 \times 5 + 6 = 1041666$   
 $\frac{11}{12}$  of  $\mathcal{L}\frac{21}{20} = \mathcal{L}77 \div 100 = .77$   
 $\mathcal{L}9147916$  *Ans.*
- (178) The fast train will reach London in  $120 + 25 = 4\frac{1}{2}$  hrs.  
 The luggage train in  $\frac{120}{12}$  times 50 min.  $= 6\frac{2}{3}$  hrs.  
 $\therefore$  the latter must have left  $6\frac{2}{3} - 4\frac{1}{2}$  or  $1\frac{1}{6}$  hrs. before the fast  
 train; viz. 1 hr. 52 min. before 2 o'clock; or at  
 8 min. past 12. *Ans.*
- (179) Com. on  $\mathcal{L}126$  at  $\frac{5}{8}$  p. c.  $= \frac{5}{800}$  or  $\frac{1}{160}$  of  $\mathcal{L}126 = \mathcal{L}\frac{63}{80}$ ;  
 $\mathcal{L}1$  11s. 6d.  $= \mathcal{L}1\frac{23}{40} = \mathcal{L}\frac{63}{40}$ ;  
 $\frac{63}{80} \div \frac{63}{40} = \frac{40}{80} = .5$ . *Ans.*
- (180) 5s. per yd.  $= \frac{5}{4}$  of 5s. or 6s. 3d. per ell;  
 6s. 3d. : 6s. 4d. :: 108 :  $109\frac{11}{12}$ ; or  $9\frac{11}{12}$  p. c. profit. *Ans.*
- (181)  $\sqrt[3]{007,301,384} = 194$ ;  $\sqrt[3]{32,768} = 32$ ;  
 $\sqrt{\frac{289}{4} = \frac{17}{2}} = 8.5$ ;  $\therefore 32 \cdot 194 \times 8.5 = 273 \cdot 649$ . *Ans.*
- (182) Int. on 100  $= \frac{39}{8} \times \frac{1}{3} = 1\frac{5}{8}$ ;  $\therefore$  100 is the present worth of  $101\frac{5}{8}$ ;  
 or 800 of 813;  
 $\therefore \frac{800}{813}$  of 10569s.  $= 13s. \times 800 = \mathcal{L}520$ . *Ans.*
- (183)  $240 \overline{) 84,720,960}$ ;  
 $240 \times 3 \times 4 = 2880$ . *Ans.*  
 $17\frac{1}{2}$  yds. + 1760 yds.  $= 7$  mi. +  $(64 \times 11) = 00994318$  mi. *Ans.*  
 $\frac{5}{9}$  of  $\frac{5}{13}$  of 30d. + 42d.  $= \frac{75 \times 30}{42 \times 117} = \frac{125}{273}$ . *Ans.*
- (184) The rates of income per  $\mathcal{L}$  invested are  $\mathcal{L}\frac{3}{98\frac{3}{8}}$  and  $\mathcal{L}\frac{3\frac{1}{2}}{106\frac{1}{2}}$ ,  
 $= \mathcal{L}\frac{21}{688\frac{5}{8}}$  and  $\mathcal{L}\frac{21}{637\frac{1}{2}}$ ; and as the latter is the greater value,  
 the  $3\frac{1}{2}$  per cents is best. *Ans.*
- (185) The shares are as 3, 5, and 8; sum 16; hence  $\mathcal{L}1000 \div 16$   
 $= \mathcal{L}62$  10s.; which  $\times 3, 5, 8$ , gives the several shares  
 A  $\mathcal{L}187$  10s., B  $\mathcal{L}312$  10s., C  $\mathcal{L}500$ . *Ans.*

- (186)  $4\frac{776}{7000}$  lbs. Av. each 7000 grs. = 28776 grs.  
 = 1199 dwt. = 4 lbs. 11 oz. 19 dwt. *Ans.*  
 $34\frac{1}{2}$  lbs. =  $34 \cdot 125$  lbs. = 3046875 cwt.;  
 hence, 3046875 cwt. = 165234375 ton. *Ans.*  
 $\cdot 0975 = \frac{975}{10000} = \frac{39}{400}$ . *Ans.*  $\cdot 63 = \frac{63}{99} = \frac{7}{11}$ . *Ans.*  
 $\cdot 5243 = \cdot 5243 = 5\frac{243}{37} = 5\frac{3}{37} \times \frac{1}{10} = \frac{194}{370} = \frac{97}{185}$ . *Ans.*
- (187)  $3696 \times \frac{21}{20}$  tons, common weight,  $\frac{67}{100}$  of which is  
 $= \frac{3696 \times 21 \times 55}{20 \times 800} = \frac{231 \times 1155}{1000} = 266 \text{ tons } 16\frac{1}{10} \text{ cwt.}$  *Ans.*
- (188) A furlong being 660 ft., the extent of the parish is  $6 \times 660 \times 4$   
 $\times 660$  sq. ft. The area within the plantation is 400 ft. shorter  
 in length and breadth, and is therefore 3560 ft. by 2240 ft.;  
 and from this inner area are to be deducted for the roads  
 $3560 \times 60$  and  $2240 \times 41$ , excepting a space equal to the area  
 of intersection of the roads =  $60 \times 41$ ; leaving, therefore,  
 $3560 \times 2180 - 2180 \times 41$  sq. ft. =  $3519 \times 2180$  sq. ft.  
 =  $391 \times 2180$  sq. yds. of field;  
 $852380$  sq. yds. +  $4840$  sq. yds. =  $176$  ac.  $540$  sq. yds. *Ans.*
- (189)  $\left. \begin{array}{l} 5\frac{1}{2} : 52\frac{1}{2} \text{ lbs.} \\ 5\frac{3}{4} : 18\frac{1}{2} \end{array} \right\} :: 6d. : \frac{6d. \times 209 \times 37}{11 \times 23} = \frac{114d. \times 37}{23}$   
 $= 183\frac{3}{23}d. = 15s. 3\frac{3}{23}d.$  *Ans.*
- (190) Int. on 100 =  $\frac{1}{2}$  of  $4\frac{1}{2} = 1\frac{1}{2}$ ;  $\therefore$  100 is the present worth of  $101\frac{1}{2}$ ,  
 or 800 of 809.  
 $\frac{800}{809}$  of  $\pounds 273$  Os.  $9d.$  =  $64800d.$  =  $\pounds 270$ . *Ans.*  
 $\pounds 105 \times 3\frac{1}{2}$  hundredths  
 $3 \cdot 15$   
 $\cdot 525$   
 $08 \cdot 675 \times 3\frac{1}{2}$  hund.  
 $3 \cdot 26025$   
 $\cdot 543375$   
 $112 \cdot 478625 \times 3\frac{1}{2}$  hund.  
 $3 \cdot 37435875$   
 $\cdot 562393125$   
 $116 \cdot 415376875$  amount.  
 $105$   
 $\pounds 11 \cdot 415376875$  Int. = *Ans.*
- (Otherwise):  
 $103\frac{1}{2}$ , or  $\frac{207}{100}$ , cubed,  
 gives  $\pounds 8869743$  the amount of  
 $8000000$   
 $\pounds 1$  in 3 yrs;  
 $\therefore$  Int. of do. =  $\pounds \frac{8869743}{8000000}$ ;  
 which  $\times 105$  will give the com-  
 pound interest of  $\pounds 105$ .
- (191) The  $1st + 2 =$  the  $2nd + \frac{3}{2} =$  the  $3rd + \frac{4}{3} =$  the  $4th + \frac{5}{4}$ ; or the bat-  
 talions are as 2,  $1\frac{1}{2}$ ,  $1\frac{1}{3}$ ,  $1\frac{1}{4}$ ; or as 24, 18, 16, 15; sum 73;  
 hence,  $7300 \div 73 = 100$ ; which  $\times$  the proportional nos. gives  
 2400, 1800, 1600, and 1500. *Ans.*

$$(192) \text{ The coin mina} = 219 \text{ grs.} \times 50 = \frac{219 \text{ oz.} \times 50}{24 \times 20} \text{ at } 5s. \\ = 219s. \times 50 \div 96 = \pounds 5 \text{ } 14s. \text{ } 0\frac{3}{4}d. \text{ } Ans.$$

$$\text{The weight mina of gold} = \frac{219 \text{ oz.} \times 100}{24 \times 20} \text{ at } \pounds 4 \\ = \pounds 219 \times 100 \div 120 = \pounds 182 \text{ } 10s. \text{ } Ans.$$

$$\text{The weight mina of silver} = \frac{219 \text{ oz.} \times 60}{24 \times 20} \text{ at } 5s. \\ = 219s. \times 60 \div 96 = \pounds 6 \text{ } 16s. \text{ } 10\frac{1}{2}d. \text{ } Ans.$$

$$(193) \text{ The legacy of the elder son} = \frac{13}{25} \text{ of the estate;}$$

$$\text{that of the younger son} = \frac{13}{25} \text{ of } \frac{12}{25} = \frac{156}{625} \text{ of the estate;}$$

$$\text{that of the widow} = \frac{12}{25} \text{ of } \frac{12}{25} = \frac{144}{625} \text{ of the estate.}$$

$$\text{Now, } \frac{13}{25} - \frac{156}{625} = \frac{325 - 156}{625} = \frac{169}{625} \text{ of the estate} = \pounds 1690;$$

$$\text{or } \frac{1}{625} \text{ of it} = \pounds 10; \text{ which } \times 325, 156, 144, \text{ gives}$$

$$\text{the elder son } \pounds 3250, \text{ the younger } \pounds 1560, \text{ the widow } \pounds 1440. \text{ } Ans.$$

$$(194) \text{ } 36 \text{ is } = \frac{36}{240} \text{ or } \frac{3}{20} \text{ of both the required parts;}$$

$$\therefore \frac{1}{4} \text{ of the first added to } \frac{1}{10} \text{ of the second} = \frac{3}{20} \text{ of both;}$$

$$\text{hence, } \frac{1}{4} - \frac{3}{20} \text{ of the first must be } = \frac{3}{20} - \frac{1}{10} \text{ of the second;}$$

$$\text{or } \frac{1}{10} \text{ of the } 1st = \frac{1}{20} \text{ of the } 2nd; \text{ or the parts are as } 1 \text{ to } 2;$$

$$\therefore \frac{1}{3} \text{ and } \frac{2}{3} \text{ of } 240 = 80 \text{ and } 160. \text{ } Ans.$$

$$(195) \text{ } 5 \text{ Eng. mi.} = 4 \text{ Sc. mi.}; \therefore 1 \text{ Eng. mi.} = \frac{4}{5} \text{ Sc. mi.}; \therefore 560 \text{ Eng.} \\ \text{mi.} = \frac{4 \times 560}{5} \text{ Sc. mi.} = \frac{8 \times 560}{5} \text{ or } 896 \text{ Russ. wersts. } Ans.$$

$$(196) \left. \begin{array}{l} 2 : 547 \text{ ac.} \\ 3 : 2 \text{ qr. yrs.} \end{array} \right\} :: 23\frac{1}{2}s. : \frac{93s. \times 547}{3 \times 4} = \pounds 211 \text{ } 19s. \text{ } 3d. \text{ } Ans.$$

$$(197) \text{ The rates of income per } \pounds \text{ of investment are } \pounds \frac{3}{78\frac{3}{8}} \text{ and } \pounds \frac{3\frac{1}{2}}{95\frac{3}{16}}; \\ = \pounds \frac{21}{548\frac{5}{8}} \text{ and } \pounds \frac{21}{571\frac{1}{8}}; \text{ and the former of these being the} \\ \text{greater value, therefore the } 3 \text{ p. c. stock is best. } Ans.$$

Again,  $78\frac{3}{8} : 1 :: \frac{1}{16} : \frac{1}{1254}$  gain on 1, if I sell out;

$95\frac{3}{16} : 1 :: \frac{1}{16} : \frac{1}{1523}$  loss on 1, if I sell out;

$$\therefore \text{gain on the whole} = 139259\frac{5}{16}s. \times \left( \frac{1}{1254} - \frac{1}{1523} \right);$$

$$= \frac{2228149s. \times 269}{16 \times 1254 \times 1523} = \frac{7s. \times 269}{16 \times 6} = 19s. 7\frac{3}{8}d. \text{ Ans.}$$

$$(198) \left. \begin{array}{l} 5 : 3 \text{ m.} \\ 7 : 17\frac{1}{2} \text{ ac.} \\ 8 : 9 \text{ hrs.} \end{array} \right\} :: 5 \text{ da.} : \frac{3 \times 35 \times 9}{7 \times 8 \times 2} = 8\frac{7}{16} \text{ da. Ans.}$$

$$(199) \frac{2}{15} + \frac{5}{12} + \frac{1}{9} + \frac{4}{45} = \frac{8+25}{60} + \frac{5+4}{45} = \frac{11}{20} + \frac{1}{5} = \frac{3}{4};$$

$$\therefore 3 + 2 + \frac{3}{4} = 5\frac{3}{4}. \text{ Ans.}$$

$$3\frac{4}{27} - 2\frac{5}{9} = 3 - 2 + \frac{4}{27} - \frac{15}{27} = 1 - \frac{11}{27} = \frac{16}{27}. \text{ Ans.}$$

$$3\frac{4}{27} + 2\frac{5}{9} = 85 \div 69 = 1\frac{16}{69}. \text{ Ans.}$$

(200) The whole impression is sold to the retail bookseller for

$$6s. \times \frac{24}{25} \times \frac{70}{100} \times 5000 = 6s. \times 48 \times 70 = \pounds 1008 \text{ 0s.}$$

$$\text{Publisher's gain, 10 p. c.} = \frac{1}{10} = \frac{\pounds 100}{10} = 16s. \text{ Ans.}$$

$$\text{Author's receipts} \quad \underline{907 \quad 4}$$

$$\text{Expenses, } 1\frac{1}{2}s. \times 5000 = \underline{375 \quad 0}$$

$$\text{Author's gain} \quad \underline{\pounds 532 \quad 4s. \text{ Ans.}}$$

The retail bookseller sells 5000 copies at 6s. =  $\pounds 1500$

$$\text{And pays to the publisher} \quad \underline{1008}$$

$$\text{Retail bookseller's gain} = \underline{\pounds 492} \text{ Ans.}$$

(201)  $\sqrt{96,05 \cdot 96,01} = 98 \cdot 01$ ; the square root of which is 9.9. Ans.

$$352,045 \cdot 367,981 = 70 \cdot 61. \text{ Ans.}$$

(202) Int. on 100 =  $4\frac{1}{2} \times 1\frac{3}{4} = 7\frac{7}{8}$ ;  $\therefore 7\frac{7}{8}$  is the discount on 107 $\frac{7}{8}$ , or 63 on 863;

$$\therefore \frac{63}{863} \text{ of } \frac{\pounds 2589}{2} = \frac{\pounds 189}{2} = \pounds 94 \text{ 10s. Ans.}$$

$$\text{Int. on } \pounds 94 \text{ 10s.} = \frac{\pounds 94\frac{1}{2} \times 4\frac{1}{2} \times 1\frac{3}{4}}{100}$$

$$= (\pounds 189 \times 9 \times 7) + 1600 = \pounds 7 \text{ 8s. } 10\frac{1}{80}d. \text{ Ans.}$$

Note.—The latter Answer is the excess of the mercantile above the true discount; the mercantile discount being

$$(\pounds 1294\frac{1}{2} \times 4\frac{1}{2} \times 1\frac{3}{4}) + 100 = \pounds 101 \text{ 18s. } 10\frac{1}{80}d.$$

$$\text{and the true disc.} = \underline{94 \quad 10 \quad 0}$$

$$\text{Difference, } \underline{\pounds 7 \text{ 8s. } 10\frac{1}{80}d. \text{ Ans.}}$$

- (203)  $42 + 21 + 10 + 5 + 2 + 1 = 81$  sixpences; and 100 guin.  
= 4200 sixpences;

$$81 \overline{) 4200}$$

*Ans.* 51 of each, with a remainder of 69 sixpences;  
69 sixp. =  $\frac{23}{40} = 1\frac{23}{40}$ . *Ans.*

- (204)  $\frac{3500}{82\frac{1}{2}}$  cents at £3 = £1400 + 11 = £127 5s.  $5\frac{5}{11}d.$  *Ans.*

$$\frac{3500}{96} \text{ cents at } £3\frac{1}{2} = £12250 + 96 = £127 \text{ 12s. 1d. } \textit{Ans.}$$

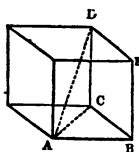
- (205) Let the annexed fig. represent a cub. ft.,  
D A the diagonal of the cube. By Euclid  
(I 47) we have

$$A C^2 = A B^2 + B C^2 = 2 C D^2$$

$$A D^2 = A C^2 + C D^2 = 3 C D^2;$$

$$\therefore A D = C D \times \sqrt{3} = 12 \sqrt{3} \text{ in.}$$

$$= 1.73205 \text{ \&c.} \times 12 = 20.7846 \text{ in. } \textit{Ans.}$$



Again, if ED and AF were drawn, the rectangle AEDF would have its length DE = CD  $\times \sqrt{2}$ , and its breadth AE = CD;  $\therefore$  its area =  $C D^2 \times \sqrt{2} = 1.41421 \text{ \&c.} \times 144 = 203.646 \text{ sq. in. } \textit{Ans.}$

- (206) 700 invested for 7 yrs. = 4900 for 1 yr.  
1900 invested for 4 yrs. = 7600 for 1 yr.

$$12500$$

$$\therefore A \text{ gets } \frac{49}{125} \text{ and } B \frac{76}{125} \text{ of } £500 = £196 \text{ and } £304. \textit{Ans.}$$

- (207)  $\left. \begin{array}{l} 24 : 90 \text{ pio.} \\ 2\frac{1}{2} : 4\frac{1}{2} \text{ da} \\ 12\frac{1}{2} : 9\frac{3}{4} \text{ hrs.} \\ 4\frac{7}{8} : 4\frac{1}{2} \text{ yds.} \\ 3\frac{5}{8} : 2\frac{1}{2} \text{ yds.} \end{array} \right\} :: 139\frac{3}{4} \text{ yds.} : \frac{559 \times 90 \times 21 \times 29 \times 9}{12 \times 25 \times 39 \times 16 \times 3}$

$$= 78561 + 160 = 491\frac{1}{160} \text{ yds. } \textit{Ans.}$$

- (208) Int. on 100 =  $\frac{210}{365}$  of  $4\frac{1}{2} = \frac{189}{73}$ ;

$$\therefore \text{the discount is } \frac{189}{73} \text{ on } 100 + \frac{189}{73}; \text{ or } 189 \text{ on } 7489;$$

$$\frac{189}{7489} \text{ of } 247187 \text{ f.} = 189 \text{ f.} \times 33 = 6237 \text{ f.} = £6 \text{ 9s. } 11\frac{1}{2}d. \textit{Ans.}$$

- (209) Circuit of room  $(15 + 12) \times 2 = 54 \text{ ft.};$   
 $54 \times 10 = 540 \text{ sq. ft. to be papered.}$

$$\frac{540}{2\frac{1}{2}} \text{ lineal ft.} = \frac{540}{\frac{5}{2}} \text{ yds. at } 7\frac{1}{2}d. = 540d. = 45s. \textit{Ans.}$$

- (210) B gets  $\frac{11}{12}$  of A; C gets  $\frac{3}{8}$  of  $\frac{11}{12}$  of A; D gets  $\frac{1}{2}$  of  $\frac{13}{8}$  of  $\frac{11}{12}$  of A;  $\therefore$  the shares are as 1,  $\frac{11}{12}$ ,  $\frac{11}{32}$ ,  $\frac{121}{192}$ ; or as 192, 176, 66, and 121; sum 555; and  $\pounds 925 \div 555 = \frac{5}{3}$ ;  $\therefore$  taking  $\frac{5}{3}$  of the proportional nos., we have  
A  $\pounds 320$ , B  $\pounds 293\frac{1}{3}$ , C  $\pounds 110$ , D  $\pounds 201\frac{2}{3}$ . *Ans.*

- (211) Assessed at  $\frac{2}{3}$  of  $\pounds 120 = \pounds 80$ .  
 $\pounds 80$  at  $(90d. + 21d. + 4d.) = 115d. \times 80 = \pounds 38 \text{ 6s. } 8d.$ ;  
 $\pounds 120 + \pounds 38 \text{ 6s. } 8d. = \pounds 158 \text{ 6s. } 8d.$  *Ans.*

- (212)  $91\frac{3}{4} + \frac{1}{8} : 540 :: \pounds 100 : \pounds 587\frac{27}{40}$ . *Ans.*

- (213) Annual income,  $\pounds 896\frac{2}{3}$   
Annual charity,  $\pounds 54$   
Annual reserve,  $\underline{210}$   
 $\qquad\qquad\qquad 264$   
365 da. : 6 da. ::  $\pounds 632\frac{2}{3} : \pounds 10 \text{ 8s.}$  *Ans.*

- (214) 13 lbs. at 63d. = 819d.  
16     at 67 = 1072  
18     at 73 = 1314  
47 lbs. are worth  $3205d. = \frac{3205}{47}d.$  per lb.  
 $100 : \frac{3205}{47}d. :: 141 : 3 \times 32.05d. = 96.15d.$   
 $= 8.0125s.$  or.  $8\frac{1}{80}s.$  *Ans.*

- (215) Int. on  $100 = 4\frac{1}{2} \times \frac{211}{32} = 11\frac{1}{16}$ ;  $\therefore 100$  is the present worth of  $111\frac{1}{16}$ ; or 1600 of 1777.  
 $\frac{1600}{1777}$  of  $\pounds \frac{8143}{4} = \pounds \frac{3257200}{1777} = \pounds 1832 \text{ 19s. } 6\frac{22}{1777}d.$  *Ans.*

- (216)  $21 \times 15 \text{ sq. yds. at } 21d. + 21 \times 1\frac{3}{4} \text{ sq. yds. at } (36 - 21)d.$   
 $= (21 + 1\frac{3}{4})d. \times 21 \times 15 = 22\frac{3}{4}d. \times 315 = 7166\frac{1}{4}d.$   
 $= \pounds 29 \text{ 17s. } 2\frac{1}{4}d.$  *Ans.*

- (217) A does 1 measure per day; and the whole work is 12 such measures. Hence, B does  $\frac{1}{18}$  of 12, or  $\frac{2}{3}$  meas. per day.  
 $1\frac{3}{4}$  meas. per day, for 3 days =  $5\frac{1}{4}$  meas. by A and B;  
 $\frac{1}{4}$  meas. per day, for 5 days =  $\frac{5}{4}$  do. by B;  
 $\qquad\qquad\qquad 9$  measures.  
 $12 - 9 = 3$  meas. done by C in 3 days;  $\therefore$  the whole 12 meas. by C in 12 da. *Ans.*



$$(218) \quad 2 \text{ cwt. } 2 \text{ qrs.} = \frac{5}{2} \text{ cwt.} = \frac{1}{8} \text{ ton};$$

$$13\frac{53}{480} \text{ tons} = 13 \text{ tons} + \frac{53}{2} \text{ lbs.} = 13 \text{ tons } 0 \text{ cwt. } 0 \text{ qr. } 26 \text{ lbs. } 8 \text{ oz.}$$

$$\frac{1}{8} \text{ of which is } 1 \text{ ton } 12 \text{ cwt. } 2 \text{ qrs. } 3 \text{ lbs. } 5 \text{ oz. } \text{Ans.}$$

$$\text{Again, } \frac{57}{55} \text{ of } 168\frac{7}{16} \text{ s.} = \frac{2695}{16} \text{ s.} \times \frac{57}{55} = \frac{49}{16} \text{ s.} \times 57 \\ = 2793 \text{ s.} \div 16 = \pounds 8 \text{ } 14 \text{ s. } 6\frac{3}{4} \text{ d. } \text{Ans.}$$

$$(219) \quad 2\frac{1}{2} \text{ ac. in. } 6\frac{2}{3} \text{ hrs.} = \frac{3}{8} \text{ ac. per hour};$$

$$2\frac{1}{8} \text{ ac. in. } 5\frac{1}{3} \text{ hrs.} = \frac{13}{32} \text{ ac. per hour};$$

$$\therefore \text{ they together do } \frac{25}{32} \text{ ac. in } 1 \text{ hour.}$$

$$\frac{25}{32} \text{ ac.} : 10 \text{ ac.} :: 1 \text{ hr.} : \frac{64}{5} \text{ hr.} = 12 \text{ hrs. } 48 \text{ min. } \text{Ans.}$$

$$\left. \begin{array}{l} \text{A's quantity} = \frac{3}{8} \text{ ac.} \times 12\frac{4}{5} = 4\frac{4}{5} \text{ ac.} \\ \text{B's do.} = \frac{13}{32} \text{ ac.} \times 12\frac{4}{5} = 5\frac{1}{5} \text{ ac.} \end{array} \right\} \text{Ans.}$$

$$(220) \quad 1 \text{ dr.} : 366 \times 16 \text{ dr.} :: 202 \text{ ft.} : 202 \times 366 \times 16 \text{ ft.} \\ = 202 \times 122 \times 16 \text{ yds.} = 224 \text{ mi. } 64 \text{ yds. } \text{Ans.}$$

$$(221) \quad \frac{7}{960} \text{ oz.} \times 143639 \times \frac{90}{100} \text{ at } \pounds 4\frac{1}{16} \text{ per oz.} \\ = \frac{\pounds 65 \times 7 \times 143639 \times 9}{16 \times 960 \times 10} = \pounds 3829 \text{ } 8 \text{ s. } 9\frac{21}{128} \text{ d. } \text{Ans.}$$

$$(222) \quad 2530\frac{41}{480} \text{ oz. at } \pounds 4\frac{1}{16} = \pounds \frac{65}{16} \times \frac{1214441}{480} \\ = \pounds 15787733 \div (16 \times 96) = \pounds 10278 \text{ } 9 \text{ s. } 5\frac{2}{33} \text{ d. } \text{Ans.}$$

$$(223) \quad \text{Int. for } 4\frac{11}{24} \text{ yrs. at } 4\frac{1}{2} \text{ p. c.} = \pounds 256\frac{23}{80} \times \frac{107}{24} \times \frac{9}{200} \\ = \frac{\pounds 20503 \times 107 \times 3}{80 \times 8 \times 200} = \pounds 51 \text{ } 8 \text{ s. } 4\frac{389}{1600} \text{ d. } \text{Ans.}$$

$$\text{Again, } \pounds 1040 \times \cdot 04 \\ \quad \quad \quad 41 \cdot 6 \text{ int.}$$

$$\quad \quad \quad 1081 \cdot 6 \quad \times \cdot 04$$

$$\quad \quad \quad 43 \cdot 264 \text{ int.}$$

$$\quad \quad \quad 1124 \cdot 864 \quad \times \cdot 04$$

$$\quad \quad \quad 44 \cdot 99456 \text{ int.}$$

$$\quad \quad \quad 1169 \cdot 85856, \text{ amount.}$$

$$\quad \quad \quad 1040 \cdot 0$$

$$\pounds 129 \cdot 85856 = \pounds 129 \text{ } 17 \text{ s. } 2\frac{34}{625} \text{ d. } \text{Ans.}$$

# SOLUTIONS OF QUESTIONS IN THE EXAMINATION PAPERS.

## Paper V.

3.  $144 \left\{ \begin{array}{l} 12 \overline{) 1254492} \text{ sq. in.} \\ 12 \overline{) 104541} \\ 9 \overline{) 8711} \dots 108 \text{ in.} \\ 30 \frac{1}{4} \overline{) 967} \dots 8 \text{ ft.} \end{array} \right.$

$$\begin{array}{r} 4 \overline{) 3868} \\ 11 \overline{) 351} \dots 7 \\ 31 \overline{) 10} \end{array} \left. \vphantom{\begin{array}{r} 4 \overline{) 3868} \\ 11 \overline{) 351} \dots 7 \\ 31 \overline{) 10} \end{array}} \right\} 117 \text{ qr. yds.} = 29 \text{ yds. } 2 \text{ ft. } 36 \text{ in.}$$

$\begin{array}{r} 8 \\ 108 \end{array}$

Ans. 31 sq. po. 30' yds. 2 ft.

4.  $\begin{array}{r} 1 \text{ ac. } 3 \text{ ro. } 39 \text{ po. } 14 \text{ yds. } 5 \text{ ft.} \\ 4 \\ 7 \text{ ro.} \\ 40 \\ 319 \text{ po.} \\ 30 \frac{1}{4} \\ 79 \frac{3}{4} \\ 9584 \\ 9663 \frac{3}{4} \text{ yds.} \end{array} \quad \left| \quad \begin{array}{r} 9663 \frac{3}{4} \text{ yds.} \\ 9 \\ 86978 \frac{3}{4} \text{ ft.} \\ 12 \\ 1043745 \\ 12 \\ 12524940 \text{ in.} \end{array} \right.$

Ans.

5.  $144 \left\{ \begin{array}{l} 12 \overline{) 123456789} \text{ sq. in.} \\ 12 \overline{) 10288065} \dots 9 \\ 9 \overline{) 857338} \dots 9 \end{array} \right\} 117 \text{ in.}$

$$\begin{array}{r} 30 \frac{1}{4} \overline{) 95259} \dots 7 \text{ ft.} \\ 4 \\ 11 \overline{) 381036} \\ 11 \overline{) 34639} \dots 7 \text{ qr. yds.} = 1 \text{ yd. } 6 \text{ ft. } 108 \text{ in.} \\ 40 \overline{) 3149} \\ 4 \overline{) 78} \dots 29 \text{ po.} \end{array}$$

$\begin{array}{r} 7 \\ 117 \end{array}$

Ans. 19 ac. 2 ro. 29 po. 2 yds. 5 ft. 81 in.

6. 2 ac. 3 ro. 13 po. 14 yds. 5 ft. 100 in.

$  \begin{array}{r}  4 \\  \overline{11 \text{ ro.}} \\  40 \\  \overline{453 \text{ po.}} \\  30\frac{1}{4} \\  \overline{113\frac{1}{4}} \\  13604 \\  \overline{13717\frac{1}{4} \text{ yds.}}  \end{array}  $	$  \begin{array}{r}  13717\frac{1}{4} \text{ yds.} \\  9 \\  \overline{123460\frac{1}{4} \text{ ft.}} \\  12 \\  \overline{1481523} \\  12 \\  \overline{17778376 \text{ in.}} \quad \text{Ans.}  \end{array}  $
---	--

- 7.

$$\begin{array}{l}
 144 \left\{ \begin{array}{l} 12)9532482 \text{ sq. in.} \\ 12)794373\dots6 \end{array} \right\} 114 \text{ in.} \\
 \quad \quad \quad 9)66197\dots9 \\
 30\frac{1}{4}) \quad 7355\dots2 \text{ ft.} \\
 \quad \quad \quad 4 \qquad \qquad \quad 4 \\
 121 \left\{ \begin{array}{l} 11)29420 \\ 11)2674\dots6 \\ 40)243\dots1 \end{array} \right\} 17 \text{ qr. yds.} = 4 \text{ yds. 2 ft. 36 in.} \\
 \quad \quad \quad 4)6\dots3 \text{ po.} \qquad \qquad \qquad 2 \quad 114 \\
 \text{Ans.} \quad \underline{\underline{1 \text{ ac. 2 ro. 3 po. 4 yds. 5 ft. 6 in.}}}
 \end{array}$$

8. 2 ro. 22 po.
- $14\frac{1}{4}$
- yds.

$$\begin{array}{r}
 40 \\
 \overline{102 \text{ po.}} \\
 30\frac{1}{4} \\
 \overline{25\frac{1}{2}} \\
 3074\frac{1}{4} \\
 \overline{3099\frac{3}{4} \text{ yds.}} \\
 9 \\
 \overline{27897\frac{3}{4} \text{ ft.}} \quad \text{Ans.}
 \end{array}$$

- 9.

Here 4 ft. 72 in.  
 $= 4\frac{1}{2} \text{ ft.} = \frac{1}{2} \text{ yd.}$   
 $\therefore$  proceed as follows:  
 22 sq. po.  $2\frac{1}{2}$  yds.  

$$\begin{array}{r}
 30\frac{1}{4} \\
 5\frac{1}{2} \\
 \overline{662\frac{1}{2}} \\
 668 \text{ yds.} \quad \text{Ans.}
 \end{array}$$

10. The capacity of the vessel is 1728 c. in.
- $\times 196\frac{1}{2}$
- ;
- 
- $\therefore 339552000 + 277274 = 1224 \cdot 6 \text{ gal.} \quad \text{Ans.}$

11. 9.48 metres each 39.371 inches = 39.371 ft.
- $\times 79$
- 
- $= 31.103 \text{ ft.} \quad \text{Ans.}$

12. 13 ft. = 156 inches, which, divided by 39.371 in.
- 
- $= 156000 \div 39371 = 3.962 \text{ met.} \quad \text{Ans.}$

13. A decametre is 10 metres = 393.71 inches;
- 
- and 1760 yds. = 63360 in.
- 
- $\therefore 6336000 \div 39371 = 160.93 \text{ decam.} \quad \text{Ans.}$

14. 100 links = 22 yds.;
- $\therefore 1 \text{ link} = .22 \text{ yd.}$
- 
- $\therefore 1 \text{ sq. link} = .0484 \text{ sq. yd.}$
- ; and as 1 acre is = 4840 sq. yds.
- 
- $\therefore 4840 \div .0484 = 100000 \text{ sq. lks.} \quad \text{Ans.}$

15.  $2\frac{1}{2}$  bricks is  $\frac{2\frac{1}{2}}{1\frac{1}{2}}$  or  $\frac{5}{3}$  of standard thickness;  
 $48 \text{ sq. ft.} \times 22 \times \frac{5}{3} \text{ standard} = 16 \text{ sq. ft.} \times 110$ ;  
 $16 \times 110 + 272\frac{1}{4} = 64 \times 110 + 1089 = 640 + 99 = 649\frac{1}{4} \text{ rods. Ans.}$

**Paper VI.**

4. The 1st boat sailed 65 mi. in  $65 \div 9\frac{3}{4}$  hrs.  
 $65 \div 9\frac{3}{4} = 260 \div 39 = 20 \div 3 = 6\frac{2}{3}$  hrs.  
 The 2nd boat took  $2\frac{1}{4}$  hrs. + 5 min. less,  
 i.e.  $2\frac{1}{4} + \frac{1}{12} = 2\frac{1}{3}$  hrs. less in sailing 65 miles;  
 hence, the rates of sailing were  $65 \div 6\frac{2}{3}$  and  $65 \div 4\frac{1}{3}$  miles per hour;  
 which are as  $\frac{3}{20}$  to  $\frac{3}{13}$ , or as 13 to 20. *Ans.*
5. Each person buys oranges at  $12 \div 10$  or  $1\frac{1}{5}d.$   
 A retails his at  $12d. \div 9$ , or  $1\frac{1}{3}d.$ , and B his at  $17d. \div 12$ , or  $1\frac{5}{12}d.$   
 Therefore the gains of A and B on equal quantities are as  $1\frac{1}{3} - 1\frac{1}{5}$   
 to  $1\frac{5}{12} - 1\frac{1}{5}$ , or as  $\frac{2}{15}$  to  $\frac{13}{60}$ , or as 8 : 13. *Ans.*
6. A's rate is  $\frac{4}{9}$  of B's, and B's is  $\frac{21}{20}$  of C's;  $\therefore$  A's rate is  $\frac{4}{9}$  of  $\frac{21}{20}$   
 of C's =  $\frac{7}{15}$  of C's; or A : C :: 7 : 15. *Ans.*
7. T gets  $\frac{3\frac{1}{2}}{4}$  or  $\frac{7}{8}$  of W, W gets  $\frac{4\frac{1}{2}}{3}$  or  $\frac{3}{2}$  of H, and H gets  $\frac{2\frac{1}{2}}{3}$  or  $\frac{5}{6}$   
 of R.  
 Hence, calling R's proportion 6, H's is 5, W's  $\frac{3}{2}$  of 5 =  $7\frac{1}{2}$ , and  
 T's  $\frac{7}{8}$  of  $7\frac{1}{2}$  =  $6\frac{3}{8}$ ; or the four shares are as 96, 80, 120, 105.  
*Ans.*
8. Since 3 men and 11 boys are equal to 5 men and 5 boys,  
 $\therefore$  5 - 3 men must be as good as 11 - 5 boys;  
 that is, 2 men = 6 boys, or 1 man = 3 boys;  
 or, a boy's work in any given time is  $\frac{1}{3}$  of a man's work in that  
 time. *Ans.*
9. M contains 27 gals. wine + 11 gals. spirits, together equal in strength  
 to  $27 + 33$  or 60 gals. wine. Similarly, N's contents are to-  
 gether equal in strength to  $43 + 42$  or 85 gals. wine. Now, the  
 1st mixture consists of 38 gals., and the 2nd of 57; therefore,  
 the strengths are as  $\frac{60}{38}$  to  $\frac{85}{57}$ , or as 90 : 85, or as 18 : 17. *Ans.*

## Paper VII.

1.  $(83 + 80 + 75 + 80 + 77 + 72) \div 6 = 467 \div 6 = 77\frac{5}{6}$ . *Ans.*
2. The amount of 6 days' receipts is 145s.  $10\frac{1}{2}d$ . ; therefore the average daily receipt is 24s.  $3\frac{3}{4}d$ . *Ans.*
3. Total in 3 years = 1334470200 bu.  
 $\therefore$  Average yearly produce = 444823400 bu. at a quarter of a dollar,  
viz. at 1s. = £22241170. *Ans.*
4. Sum,  $286^{\circ} 11'$ ; which  $\div 7$  gives  $40^{\circ} 53'$ . *Ans.*
5.
$$\begin{array}{r} 3 \text{ qts. at } 9d. = 27d. \\ 10 \text{ pts. at } 2\frac{1}{2}d. = 25d. \\ \hline 3 \text{ qts.} + 10 \text{ pts.} = 16 \text{ pts. are worth } 52d. \\ \therefore 1 \text{ pt. is worth } 3\frac{1}{4}d. \end{array}$$
*Ans.*
6.
$$\begin{array}{r} 4 \text{ at } 19 = 76 \\ 3 \text{ at } 20 = 60 \\ 2 \text{ at } 21 = 42 \\ 3 \text{ at } 23 = 69 \\ \hline 12 \quad )247 \\ \underline{207} \\ 40 \end{array}$$
*Ans.*
7. The average width is  
 $\frac{1}{2}(9 + 7)$  in. = 8 in. =  $\frac{2}{3}$  ft.  
 $10\frac{1}{2}$  sq. ft.  $\times \frac{2}{3} = 7$  sq. ft. *Ans.*
8.
$$\begin{array}{r} 21 \text{ at } 61 = 1281, \text{ amt. of } 21 \text{ results} \\ 8 \text{ at } 64 = 512 \\ 11 \text{ at } 59 = 649 \\ \hline \quad \quad \quad 1161, \text{ amt. of } 19 \\ 2 \overline{)120}, \text{ amt. of } 2 \\ \underline{60.} \end{array}$$
*Ans.*
9. There is 1 quantity of the 2nd ;  
the 1st is 1 such quantity + 5 lbs.  
the 3rd is 2 such quantities + 11 lbs.  
136 lbs. = 4 such quantities + 16 lbs.  
 $\therefore 136 - 16$ , or 120 lbs. is 4 times the 2nd.  
 $\therefore 30$  lbs. is the 2nd quantity, 35 lbs. the 1st, 71 lbs. the 3rd.  

$$\begin{array}{r} 35 \text{ lbs. @ } 3/8 = 1540d. \\ 30 \quad \quad @ 4/2 = 1500 \\ 71 \quad \quad @ 4/4 = 3692 \\ \hline 136 \text{ lbs. worth } 6732d. \\ \therefore 1 \text{ lb. worth } 49\frac{1}{2}d. = 4(1\frac{1}{2}). \end{array}$$
*Ans.*



$$\begin{array}{lcl} \therefore \text{A's time of doing the 14 meas.} & = 14 \div \frac{5}{12} = 33\frac{3}{5} \text{ hrs.} \\ \text{B's do.} & " & = 14 \div \frac{7}{12} = 24 \text{ hrs.} \\ \text{C's do.} & " & = 14 \div \frac{3}{4} = 18\frac{2}{3} \text{ hrs.} \end{array} \left. \vphantom{\begin{array}{l} \\ \\ \end{array}} \right\} \text{Ans.}$$

8. B does 1 measure of work per day; A and C together do 2 such measures per day;  $\therefore$  A, B, C together do 3 meas. per day; and as A, B, C do the whole work in 5 days, the whole work is 15 meas. Now, A and B together do, per day, thrice as much as C, that is,  $\frac{3}{4}$  of what A, B, C do per day, viz.  $\frac{3}{4}$  of 3 m. =  $2\frac{1}{4}$  meas. Hence, in 1 day, A does  $2\frac{1}{4} - 1 = 1\frac{1}{4}$  meas., B does 1 meas., and C does  $(1\frac{1}{4} + 1) \div 3 = \frac{3}{4}$  meas.; and, therefore, to do the whole 15 meas., A would take  $15 \div 1\frac{1}{4} = 12$  da., B  $15 \div 1 = 15$  da., and C  $15 \div \frac{3}{4} = 20$  da. *Ans.*

9. B does 1 measure of work per day; and the whole work is 9 such measures; of which A does per day  $\frac{1}{10} = \frac{9}{10}$  meas., and C  $\frac{1}{12} = \frac{3}{4}$  meas.

A in  $3\frac{3}{5}$  da. would have done  $\frac{9}{10}$  meas.  $\times \frac{18}{5} = 3\frac{6}{5}$  meas.

B in  $2\frac{2}{5}$  da. " " "  $2\frac{2}{5}$  meas.

so that, if A and B had continued to the end of C's time, there would have been done  $9 + 3\frac{6}{5} + 2\frac{2}{5} = 14\frac{21}{25}$  meas., at the rate of  $\frac{9}{10} + 1 + \frac{3}{4} = 2\frac{13}{20}$  meas. per da.

$$\therefore 14\frac{21}{25} \div 2\frac{13}{20} = 1484 + 265 = 5\frac{3}{5} \text{ da. } \text{Ans.}$$

10. A does 1 measure per hour; and the whole content is 9 such measures; of which B does, per hour,  $\frac{1}{10} = \frac{9}{10}$  meas., C  $\frac{1}{12} = \frac{3}{4}$  meas.,

$$D \frac{1}{8} = 1\frac{1}{8} \text{ meas.}$$

Now, first, we have  $(1\frac{1}{8} - 1) \times 8 = \frac{3}{8}$  meas. lost;

secondly,  $(1\frac{9}{10} - 1\frac{1}{8}) \times 2 = 1\frac{11}{20}$  " gained;

thirdly,  $(\frac{9}{10} - \frac{3}{4}) \times 8 = 1\frac{1}{5}$  " gained.

$$\therefore 1\frac{11}{20} + 1\frac{1}{5} - \frac{3}{8} = 2\frac{3}{8} \text{ meas. gained on the whole.}$$

$$\therefore 2\frac{3}{8} \text{ meas.} = 95 \text{ gals.; or 1 meas.} = 40 \text{ gals.;$$

or 9 meas. = 360 gals., the content of the cistern. *Ans.*

Again, if all the pipes were set open at once, the effect would be

$$1 + \frac{9}{10} - \left(\frac{3}{4} + 1\frac{1}{8}\right) = \frac{1}{40} \text{ of a measure gained per hour, i.e. } \frac{1}{40} \text{ of } 40 \text{ gals.} = 1 \text{ gal. } \text{Ans.}$$

## Paper IX.

1.  $396.53 \text{ dols. @ } 4/6 = \frac{9}{40} \text{ of } £396.53 = £89.21925. \text{ Ans.}$
2.  $1206.7 \text{ dols. @ } 5.45 \text{ frs.} = 6576.51\frac{1}{2} \text{ frs. Ans.}$
3.  $£3758.825 @ 25.35 \text{ frs.} = 95286.21\frac{3}{8} \text{ frs. Ans.}$
4.  $7889.9 \text{ frs.} \div 24.415 = 7889900 + 24415 = £383 \text{ 3s. } 1\frac{11}{16}d. \text{ Ans.}$
5.  $25.57 \text{ frs.} = 240d. \therefore 2557 \text{ frs.} = 24000d. \therefore 1 \text{ fr.} = 9.386d. \text{ Ans.}$
6.  $197586d. \div 3161\frac{3}{8} \text{ milrees} = 1580688 + 25291 = 62.5d. \text{ nearly, or } 62\frac{1}{2}d. \text{ Ans.}$
7.  $85155d. \div 38\frac{1}{2}d. = 24330 + 11 = 2211 \text{ dols. } 16\frac{4}{11} \text{ re. Ans.}$
8. Here  $1 \text{ franc} = 240d. + 25.65 = 1600 + 171$ ;  
 also  $1 \text{ franc} = 175 \text{ rees.} = \frac{7}{40} \text{ of a milree}$ ;  
 $\therefore \frac{7}{40} \text{ milr.} = \frac{1600}{171}d., \text{ or } 1 \text{ milr.} = \frac{64000}{1197}d. = 53\frac{1}{3}d. \text{ nearly. Ans.}$
9.  $1 \text{ ru.} = \frac{68\frac{1}{4}}{32} \text{ mks., each mk.} = \frac{383}{437} \text{ fl., each fl.} = \frac{2489}{1165} \text{ fr.}$   
 $\therefore 932 \text{ ru.} = \frac{932 \times 68\frac{1}{4} \times 383 \times 2489}{32 \times 437 \times 1165} \text{ francs,}$   
 $= \frac{233 \times 273 \times 383 \times 131}{32 \times 23 \times 11\frac{4}{5}} = \frac{13697229}{3680} = 3722.07 \text{ frs. Ans.}$
10. 1 franc is worth  $1 \div 1\frac{1}{4} = \frac{4}{5}$  shill.  
 $\therefore 1 \text{ scudo, worth } 5\frac{3}{5} \text{ francs, is} = 4\frac{3}{5} \text{ shill.}$   
 $\therefore 45 \text{ scudi and } 12 \text{ francs} = 4\frac{3}{5} \times 45 + \frac{4}{5} \times 12$   
 $= 194\frac{3}{5} + 9\frac{3}{5} = 204s. = £10 \text{ 4s.; so that the discount allowed is } 4s. \text{ Ans.}$   
 Again,  $96 : 240s. :: 100 : 250s.$   
 $50 \text{ scudi at } 4\frac{3}{5}s. = 216s.$   
 Value to be given in francs,  $34s.$   
 $\therefore 34s. \div \frac{4}{5}s. = 42\frac{1}{2} \text{ francs. Ans.}$



11. *First*, 1 flor. =  $\frac{100}{45\frac{1}{2}}$  frs., each franc  $\frac{\pounds 10}{253}$ ;  
 or, 1 flor. =  $\frac{\pounds 10}{253} \times \frac{200}{91} = \pounds 0.08687$ .  
*Secondly*, 1 flor. =  $\frac{24}{11}$  frs., each franc =  $\frac{\pounds 100}{2545}$ ;  
 or, 1 flor. =  $\frac{\pounds 20}{509} \times \frac{24}{11} = \pounds 0.08573$ .  
 $\therefore$  Gain per florin =  $\pounds 0.00114$ ; and on 350.75 flor.  
 =  $\pounds 399875 = \pounds 4$ , or 8s., nearly. *Ans.*
12. *Circuitously*,  $\pounds 1 = 11.9$  flor., each flor. =  $\frac{21}{10}$  frs., each franc  
 = .16 milree;  
 or,  $\pounds 1 = \frac{16}{100}$  milr.  $\times \frac{21}{10} \times \frac{119}{10} = 3.9984$  milr.  
 Deduct  $1\frac{1}{2}$  per cent. =  $\frac{.059976}{3.938424}$   
*Directly*,  $\pounds 1 = \frac{240}{61\frac{1}{2}}$  milr. =  $\frac{160}{41}$  m. =  $3.902439$   
 Gain, per  $\pounds$ , by circuitous remittance, .035985 milr.  
 which on  $\pounds 1000$  is 35.985 milr. *Ans.*
13. Here we have to find how much sterling will be paid with 750 dols.,  
 when 105 dols. are given for 100 times 4s. 6d.  
 $105 : 750 :: 4\frac{1}{2}s. \times 100 : \pounds 160 \text{ } 14s. \text{ } 3\frac{3}{4}d.$  *Ans.*
14.  $5217.219 \text{ rup.} \times 2.63 \times .035 = 480.245 \text{ frs.} = 480 \text{ frs. } 24\frac{1}{2} \text{ cts.}$  *Ans.*
15. The prime cost with export charges is  $\frac{21s. \times 107\frac{1}{2}}{100}$ ; and we have  
 to find such an amount as when diminished by 5 per cent. will  
 leave the above sum for nett proceeds of sale. The amount will  
 be =  $\frac{21s. \times 107\frac{1}{2} \times 100}{100 \times 95}$ ; and this amount converted into dollars,  
 each worth  $\frac{4\frac{1}{2}s. \times 100}{106}$  gives  
 $\frac{21s. \times 107\frac{1}{2}}{95} \div \frac{4\frac{1}{2}s. \times 100}{106} = \frac{7 \times 43 \times 53}{19 \times 3 \times 50} = 5.59\frac{3}{4} \text{ dols.}$  *Ans.*
16. Here we have  $60d. \times \frac{98\frac{3}{4}}{100} \times \frac{91}{100} \times \frac{100}{120}$ , the cost on board at Calcutta;  
 which  $\times \frac{100}{106}$  for shipping charges, will give the first cost; and  
 then, converting the money at 25d. per rupee, we shall have  
 $\frac{15 \times 395 \times 91}{25 \times 120 \times 106} = \frac{7189}{4240} = 1 \text{ rup. } 11.13 \text{ ann.}$  *Ans.*

17. (i.) 1 franc =  $\frac{10}{31}$  gramme French standard, each gramme Fr. standard =  $\frac{10}{311}$  oz., each oz. Fr. standard =  $\frac{3100}{3151}$  oz. Eng. standard, or 1 franc =  $\frac{3100}{3151} \times \frac{10}{311} \times \frac{10}{31} = \frac{10000}{979961} = .0102045$  oz. Eng. standard. *Ans.*  
 $20s. + 7\frac{7}{8}s. \times .0102045 = 160 \div 6.3574 = 25.17$  francs per £. *Ans.*  
 (ii.)  $1000 : 1014\frac{1}{2} :: 25.17 \text{ frs.} : 25.53\frac{1}{2} \text{ frs.}$  *Ans.*  
 $1000 : 1 :: 25.17 \text{ frs.} : .02517 \text{ fr.}$   
 $\frac{.02517}{25.14483} = 25.14\frac{1}{2} \text{ frs.}$  *Ans.*  
 (iii.) a.  $1000 : 1007\frac{1}{2} : 25.17 \text{ frs.} : 25.35\frac{3}{4} \text{ frs.}$   
 $25.335 : 25.3575 - 25.335 :: 100 : .088 \text{ p. c. dearer in Paris.}$  *Ans.*  
 b.  $1000 : 1000\frac{1}{2} : 25.17 \text{ frs.} : 25.18\frac{1}{2} \text{ frs.}$   
 $25.1825 : 25.275 - 25.1825 :: 100 : .367 \text{ p. c. dearer in London.}$  *Ans.*

## Paper X.

3.  $25 \text{ ox.} : 29 \text{ ox.} :: 7 \text{ wks} : 8\frac{3}{25} \text{ wks.}$   
 $2 \text{ wks. growth eaten by } 25 \text{ ox. in } \frac{22}{25} \text{ wk.}$   
 $\frac{22}{25} \text{ wk.} : 9 \text{ wks.} :: 2 \text{ wks. growth} : 20\frac{5}{11} \text{ wks. growth;}$   
 $\therefore \text{ the original grass is } = \frac{9}{11\frac{5}{11}} \text{ wks. growth.}$   
 $\frac{11\frac{5}{11}}{9} \quad \frac{11\frac{5}{11}}{6}$   
 $\left. \begin{array}{l} 20\frac{5}{11} \text{ wks. growth} : 17\frac{5}{11} \text{ wks. growth} \\ 6 \text{ wks.} : 9 \text{ wks.} \end{array} \right\} \begin{array}{l} \text{ox.} \quad \text{ox.} \\ :: 25 : 32. \end{array} \text{ } \textit{Ans.}$
4.  $7 \text{ taps} : 12 \text{ taps} :: 7\frac{1}{2} \text{ min.} : 12\frac{9}{4} \text{ min.}$   
 $8\frac{1}{2} \text{ min. supply emptied by } 7 \text{ taps in } \frac{31}{4} \text{ min.}$   
 $3\frac{1}{4} \text{ min.} : 16 \text{ min.} :: 8\frac{1}{2} \text{ min. supply} : 43\frac{3}{11} \text{ min. supply.}$   
 $\frac{16}{16}$   
 $\therefore \text{ the quantity in the tank at first } = 27\frac{3}{11} \text{ min. supply.}$   
 $\frac{27\frac{3}{11}}{16} \quad \frac{27\frac{3}{11}}{50}$   
 $\left. \begin{array}{l} 43\frac{3}{11} \text{ min. supply} : 77\frac{3}{11} \text{ min. supply} \\ 50 \text{ min.} : 16 \text{ min.} \end{array} \right\} \begin{array}{l} \text{taps.} \quad \text{taps.} \\ :: 7 : 4. \end{array} \text{ } \textit{Ans.}$

5.  $21 \text{ ox.} : 20 \text{ ox.} :: 12\frac{3}{4} \text{ da.} : 12\frac{1}{4} \text{ da.}$   
 $\frac{12}{12}$

$\frac{3}{4} \text{ da. growth eaten by 21 ox. in } \frac{1}{4} \text{ da.}$   
 $\frac{1}{4} \text{ da.} : 12 \text{ da.} :: \frac{3}{4} \text{ da. growth} : 63 \text{ da. growth};$   
 $\frac{12}{12}$

$\therefore$  the original grass is  $= 51 \text{ da. growth.}$

Now,  $12 + 51$  days' growth being eaten by 21 oxen in 12 days, the time is required for 26 oxen to eat what grows in the required time + 51 da. growth.

$21 \text{ ox.} : 26 \text{ ox.} \left. \vphantom{\begin{array}{l} 21 \text{ ox.} \\ 26 \text{ ox.} \end{array}} \right\} :: 63 \text{ da. growth} : 6\frac{1}{2} \text{ da. growth};$   
 $12 \text{ da.} : 1 \text{ da.} \left. \vphantom{\begin{array}{l} 12 \text{ da.} \\ 1 \text{ da.} \end{array}} \right\} :: 6\frac{1}{2} \text{ da. growth in 1 day};$   
 $\frac{1}{1}$

thus consuming  $5\frac{1}{2} \text{ da. growth of the original grass per day;}$  or the whole in  $51 \div 5\frac{1}{2} = 9\frac{3}{11} \text{ da.}$  *Ans.*

6.  $31 \text{ m.} : 15 \text{ m.} :: 11 \text{ wks.} : 5\frac{10}{31} \text{ wks.}$   
 $\frac{5}{5}$

6 wks. interest pays 31 men for  $\frac{10}{31} \text{ wk.}$

$\frac{10}{31} \text{ wk.} : 5 \text{ wks.} :: 6 \text{ wks. int.} : 93 \text{ wks. int.}$   
 $\frac{5}{5}$

$\therefore$  the original interest is that of  $88 \text{ wks.}$

Now,  $5 + 88 \text{ wks. int.}$  sufficing to pay 31 men for 5 wks., the time is required in which 9 men would earn the interest for the required time + 88 wks. interest.

$31 \text{ m.} : 9 \text{ m.} \left. \vphantom{\begin{array}{l} 31 \text{ m.} \\ 9 \text{ m.} \end{array}} \right\} :: 93 \text{ wks. int.} : 5\frac{1}{2} \text{ wks. int.}$   
 $5 \text{ wk.} : 1 \text{ wk.} \left. \vphantom{\begin{array}{l} 5 \text{ wk.} \\ 1 \text{ wk.} \end{array}} \right\} :: 5\frac{1}{2} \text{ wks. int. in 1 wk.}$   
 $\frac{1}{1}$

thus consuming in 1 week  $4\frac{1}{2} \text{ wks. value of original int.};$  or the whole in  $88 \div 4\frac{1}{2} = 20 \text{ wks.}$  *Ans.*

7. Since  $2\frac{7}{8} \text{ ox.}$  consume 1 acre in 26 da., and  $3\frac{1}{4} \text{ ox.}$  consume 1 acre in 20 da., let us first find how many oxen would consume 1 acre in  $5\frac{7}{8} \text{ days.}$

$3\frac{1}{4} \text{ ox.} : 2\frac{7}{8} \text{ ox.} :: 26 \text{ da.} : 20 \cdot 93 \text{ da.}$   
 $\frac{20}{20}$

$6 \text{ da. growth eaten by } 3\frac{1}{4} \text{ ox. in } \frac{1}{4} \cdot 93 \text{ da.}$   
 $\cdot 93 \text{ da.} : 20 \text{ da.} :: 6 \text{ da. growth} : 129\frac{1}{31} \text{ da. growth.}$   
 $\frac{20}{20}$

$\therefore$  the original grass is  $= 109\frac{1}{31} \text{ da. growth.}$

$109\frac{1}{31}$        $109\frac{1}{31}$   
 $\frac{20}{20}$        $\frac{5\frac{7}{8}}{5\frac{7}{8}}$   
 $129\frac{1}{31} \text{ da. growth} : 114\frac{226}{379} \text{ da. growth} \left. \vphantom{\begin{array}{l} 129\frac{1}{31} \text{ da. growth} \\ 114\frac{226}{379} \text{ da. growth} \end{array}} \right\} \text{ ox. ox.}$   
 $5\frac{7}{8} \text{ da.} : 20 \text{ da.} \left. \vphantom{\begin{array}{l} 5\frac{7}{8} \text{ da.} \\ 20 \text{ da.} \end{array}} \right\} :: 3\frac{1}{4} : 11;$

11 oxen would consume 1 acre; hence 33 oxen would consume 3 acres. *Ans.*

8. 19 ox. : 17 ox. :: 30 da. :  $26\frac{16}{19}$  da.

$$\frac{24}{19} \text{ oxen eat 6 da. growth in } 2\frac{16}{19} \text{ da.}$$

$$2\frac{16}{19} \text{ da. : 24 da. :: 6 da. growth : } 50\frac{2}{3} \text{ da. growth}$$

$$\frac{24}{19}$$

$$\therefore \text{ the original grass is } = 26\frac{2}{3} \text{ da. growth;}$$

and we have now to find a number of oxen to eat  $26\frac{2}{3} + 8$ , or  $34\frac{2}{3}$  days' growth.

Now, since 19 oxen in  $2\frac{16}{19}$  da. eat 6 da. growth,

$$\therefore 1 \text{ ox. in 54 da. eats 6 da. growth,}$$

$$\therefore \text{ the 4 oxen in 6 da. eat } 2\frac{2}{3} \text{ da. growth,}$$

leaving  $34\frac{2}{3} - 2\frac{2}{3} = 32$  da. growth to be eaten in 8 da.;

and this, according to the following proportion, will require 36 oxen :

$$\left. \begin{array}{l} 6 \text{ da. growth : } 32 \text{ da. growth} \\ 8 \text{ da. : } 54 \text{ da.} \end{array} \right\} :: 1 \text{ ox. : } 36 \text{ ox.}$$

$\therefore$  the required no. of oxen is  $36 + 4 = 40$  oxen. *Ans.*

9. 15 oxen for  $5\frac{1}{2}$  ac. is 25 oxen for  $8\frac{3}{4}$  ac  
 22 for  $7\frac{1}{2}$  is  $25\frac{2}{3}$  „ for  $8\frac{3}{4}$   
 20 for  $6\frac{1}{4}$  is 28 „ for  $8\frac{3}{4}$

Now, let the time in which 25 ox. would consume the  $8\frac{3}{4}$  acres be called 4 periods; then the time in which 31 ox. would do so will be 3 such periods.

$$25 \text{ ox. : } 31 \text{ ox. :: } 3 \text{ per. : } 3\frac{18}{25} \text{ per.}$$

$$\text{Growth of 1 period eaten by 25 ox. in } \frac{7}{25} \text{ per.}$$

$$\frac{7}{25} \text{ per. : } 4 \text{ per. :: 1 period's growth : } 14\frac{2}{5} \text{ periods' growth,}$$

$$\text{Original grass} = \text{the growth of } 10\frac{2}{5} \text{ periods.}$$

Now, since 25 ox. in  $\frac{7}{25}$  per. eat 1 period's growth,

$$\therefore 1 \text{ ox. in 1 per. eats } \frac{1}{4} \text{ period's growth;}$$

$$\therefore 25\frac{2}{3} \text{ ox. in 1 per. eat } 3\frac{2}{3} \text{ periods' growth,}$$

$$\text{and } 28 \text{ ox. in 1 per. eat 4 periods' growth;}$$

the  $25\frac{2}{3}$  ox. thus consuming  $2\frac{2}{3}$  periods' growth of the original grass in 1 period, and the 28 ox. consuming 3 periods' growth of the original grass in one period; or the whole being consumed

$$\text{by } 25\frac{2}{3} \text{ ox. in } 10\frac{2}{5} + 2\frac{2}{3} = 3\frac{2}{3} \text{ periods,}$$

$$\text{and by } 28 \text{ ox. in } 10\frac{2}{5} \div 3 = 3\frac{2}{5} \text{ periods:}$$

$$\text{hence, the given difference 3 da.} = \frac{3}{5} \text{ period;}$$

$$\text{and the 3 periods taken by 31 oxen} = 21 \text{ da. } \textit{Ans.}$$

10. The powers of C and D being as 1 to  $1\frac{1}{2}$  C, and D together would empty any quantity in  $1 \div (1 + 1\frac{1}{2})$  or  $\frac{2}{3}$  of the time that C alone would take to do it;

$\frac{2}{3}$  of 51 m. = 20.4 m. for C and D,  
 $\frac{5.75}{5.75}$

51 - 5.75 = 45.25 m. supply emptied in 14.65 m. by C and D.

14.65 m. : 5.75 m. :: 45.25 m. supply :  $17\frac{891}{172}$  m. supply.  
 $\frac{5.75}{4}$

$\therefore$  the original supply is that of  $12\frac{3}{293}$  min.

Now, as C and D together emptied 45.25 m. supply in 14.65 m.

$\therefore$  they did  $\frac{905}{293}$  of a min. supply in 1 min.

and D's share was  $\frac{1\frac{1}{2}}{1 + 1\frac{1}{2}}$  or  $\frac{3}{5}$  of that quantity,

that is, D emptied  $12\frac{50}{293}$  min. supply in 1 min.

thus carrying off per minute  $\frac{250}{293}$  m. supply of orig. water.

$\therefore$  D would have emptied the cistern in  $12\frac{3}{293} + \frac{250}{293}$

= 3519 + 250 = 14.076 min. *Ans.*

Again, the original supply was produced by A and B running together for  $12\frac{3}{293}$  minutes, the former filling  $\frac{1}{42\frac{1}{2}}$  and the latter

$\frac{1}{46}$  of the cistern, per minute;

therefore  $\left(\frac{2}{85} + \frac{1}{46}\right) \times \frac{3519}{293} = \frac{1593}{2930}$  of the cistern. *Ans.*

## Paper XI.

4. Here  $6313 [+449] = 14\frac{27}{449}$  times the whole quantity;  
 $\therefore$  12 times the 1st part with 17 times the 2nd =  $14\frac{27}{449}$  times both;  
 $\therefore$  5 times the 2nd =  $2\frac{27}{449}$  times both;  
or, 2245 times the 2nd = 925 times both;  
or, the 2nd is  $\frac{925}{2245} = \frac{185}{449}$  of the whole; = 185 yds. } *Ans.*  
 $\therefore$  1st = 264 yds. }

5. 90 apples were sold for 74d., one part at  $\frac{5}{8}$ d. per apple, the other part at  $\frac{13}{16}$ d.

$74 [+90] = \frac{37}{45}$  of the whole quantity.

1st part  $\times \frac{5}{6}$  with 2nd  $\times \frac{13}{16} = \frac{37}{45}$  of both;

or, 600 times the 1st with 585 times the 2nd = 592 times both  
 $\therefore$  15 times the 1st = 7 times both;  
 or, the 1st part is  $\frac{7}{15}$  of the whole quantity = 42 ap. } *Ans.*  
 $\therefore$  2nd = 48 ap. }  
 90

6.  $\frac{6}{5}d. \times \frac{100}{106\frac{1}{2}} = \frac{96}{85}d.$ , average prime cost,  
 $8s. + \frac{96}{85}d. = 85$ , oranges and lemons together.  
 No. of oranges  $\times \frac{3}{2}$  with no. of lemons  $\times \frac{4}{5} = \frac{96}{85}$  of both;  
 or, no. of oranges  $\times 255$  with no. of lem.  $\times 136 = 192$  times both,  
 $\therefore 255 - 136$  or 119 times the no. of oranges = 56 times both;  
 $\therefore$  no. of oranges =  $\frac{56}{119}$  or  $\frac{8}{17}$  of 85 = 40 } *Ans.*  
 no. of lemons = 45
7. Here £4 6s. 8d. or 1040d. is to be divided into two sums, so that  
 $\frac{102\frac{1}{2}}{100}$  or  $\frac{41}{40}$  of the 1st with  $\frac{95\frac{1}{2}}{100}$  or  $\frac{191}{200}$  of the 2nd shall amount  
 to £4 5s. 11d. or 1031d.  
 $\frac{41}{40}$  of 1st with  $\frac{191}{200}$  of 2nd =  $\frac{1031}{1040}$  of both;  
 or, 5330 times 1st with 4966 times 2nd = 5155 times both;  
 $\therefore$  364 times 1st = 189 times both;  
 or the 1st is  $\frac{189}{364} = \frac{27}{52}$  of 1040d. = 540d.  
 2nd = 500d.  
 $\therefore$  tea, 540d. + 12 = 45d. = 3s. 9d. per lb. } *Ans.*  
 coffee, 500d. + 25 = 20d. = 1s. 8d. per lb. }
8. Antecedent no. of males  $\times \frac{95\cdot4}{100}$  with that of females  $\times \frac{109\cdot8}{100} = \frac{101\cdot8}{100}$   
 of the whole antecedent no.  
 or, 477 times no. of m. with 549 times no. of f. = 509 times both;  
 $\therefore$  72 times no. of f. = 32 times both;  
 or the females were  $\frac{32}{72} = \frac{4}{9}$  of the whole;  
 $\therefore$  males =  $\frac{5}{9}$  of the whole;  
 or males to females as 5 to 4. *Ans.*

## Paper XII.

- $\sqrt{1056} = 32.496$  yds.; and  $\frac{1}{11}$  of 1760 yds. = 160 yds.  
 $\therefore 32.496 \div 160 = .2031$ . *Ans.*
8.  $\sqrt{13854\frac{1}{2}}$  sq. yds. = 117.7 yds. = 21 po.  $2\frac{1}{2}$  yds. *Ans.*
9. 38 sq. po.  $6\frac{1}{2}$  yds. = 1156 sq. yds., the square root of which gives 34 yds. = 6 po. 1 yd. *Ans.*
10.  $\sqrt{95 \times 123} = \sqrt{11685} = 108.097$  yds. *Ans.*  
 The larger field consists of two squares, each containing  $190 \times 123$  sq. yds.; and its width will be a side of either square, viz.  $\sqrt{23370} = 152.8725$  yds., which  $\times 2$  gives the length =  $305\frac{3}{4}$  yds. *nearly. Ans.*
11.  $\frac{10}{\sqrt{2}} = \frac{10 \times \sqrt{2}}{\sqrt{2} \times \sqrt{2}} = \frac{10\sqrt{2}}{2} = 5\sqrt{2}$ .
12.  $\sqrt{112} \times \sqrt{175} = \sqrt{112 \times 175} = \sqrt{7 \times 16 \times 7 \times 25} = 7 \times 4 \times 5 = 140$ . *Ans.*
13.  $\sqrt{(13.02^2 + 5.2^2)} = \sqrt{196.5604} = 14.02$ . *Ans.*
14.  $\sqrt{(72^2 + 135^2)} = \sqrt{23409} = 153$  mi. *Ans.*
15.  $9^{\frac{1}{3}}$  and  $19^{\frac{1}{4}} = 9^{\frac{4}{12}}$  and  $19^{\frac{3}{12}} = 6561^{\frac{1}{12}}$  and  $6859^{\frac{1}{12}}$ ; therefore the latter is greater. *Ans.*  
 Again,  $3^{\frac{1}{2}}$  and  $15^{\frac{1}{3}} = 3^{\frac{5}{10}}$  and  $15^{\frac{2}{10}} = 243^{\frac{1}{10}}$  and  $225^{\frac{1}{10}}$ ; therefore the former is greater. *Ans.*
16.  $\sqrt{(3.4061^2 - 3.406^2)} = \sqrt{.00068121} = .0261$  in. *Ans.*
17. The square of each of the perpendicular sides of the triangle is half the square of  $353.55 = 62500$  *nearly*; and the square root of this is 250. *Ans.*
18. The no. of half-pennies  $\times$  the same no. of persons = 289 half-pennies;  $\therefore \sqrt{289} = 17$  persons, or 17 half-pennies; so that each contributed  $8\frac{1}{2}d$ . *Ans.*
19.  $\sqrt{(18.25^2 - 13.75^2)} = \sqrt{144} = 12$  ft. *Ans.*

# EXAMINATION PAPERS.

20. The square of the diagonal of one of the faces is  $=250^2 \times 2$ ; but the square of the diagonal of the cube is  $250^2 \times 2 + 250^2 = 250^3$  or the diagonal is  $=250 \times \sqrt{3} = 1.73205 \times 250 = 433$  nearly.
21. The square of the diagonal of one of the faces is  $2 \times$  the square of one of the edges; to this add the square of another edge, making the square of an edge, and we shall have the square of the cube's diagonal;  
 $\therefore$  the length of the edge  $\times \sqrt{3} =$  the cube's diagonal  $= 45$  in.;  
 hence the edge measures  $45 \div \sqrt{3} = 45 \times \sqrt{3} \div 3 = 15\sqrt{3}$   
 $= 1.732 \times 15 = 26$  in. nearly. *Ans.*  
 Again, each superficial side  $= 15\sqrt{3} \times 15\sqrt{3}$  sq. in.  
 $= 15 \times 15 \times 3$  sq. in.; and the six sides will contain  

$$\frac{15 \times 15 \times 3 \times 6}{144} \text{ sq. ft.} = \frac{225}{8} = 28\frac{1}{8} \text{ sq. ft. } \textit{Ans.}$$
22. £28 : the sum required  $::$  the sum required : £63;  
 and, therefore, the square of the sum required  $= 28 \times 63$ ,  
 $= 4 \times 7 \times 7 \times 9$ , the square root of which is  $2 \times 7 \times 3 =$  £42. *Ans.*
23. The time is 2 years; therefore, 250 multiplied *twice* in succession by the amount of £1 in 1 year is to produce  $250 + 20.4 = 270.4$ ; hence the amount of £1 for 1 year must be  

$$\sqrt{\frac{270.4}{250}} = \frac{52}{50} = 1.04$$
, which shows the rate per cent. per annum to be 4. *Ans.*
24. (a) Capacity in cubic feet  $= 277.274 \times 478.4 + 1728 = 76.7638$ .  
 This  $\div 2\frac{1}{2}$  gives the area of a square bottom for the cistern  $= 30.7055$ , the square root of which is 5.5413 ft., the length. *Ans.*  
 (b)  $76.7638 \div 6 = 12.79397$  sq. ft., area of each end; and as the end is a rectangle twice as long as it is broad, the double of it would form a square whose side is the breadth of the cistern;  
 $\therefore \sqrt{25.58794} = 5.058$  ft. *Ans.*
25.  $(\sqrt{4050} \times \frac{1}{495} \times \frac{99}{20} + \sqrt{1458}) \times \sqrt{50}$   
 $= (\sqrt{2} \times \sqrt{2025} \times \frac{1}{100} + \sqrt{2} \times \sqrt{729}) \times \sqrt{2} \times \sqrt{25}$   
 $= 10 \times 45 \times \frac{1}{100} + 10 \times 27 = 274\frac{1}{2}$ ;  
 also,  $\sqrt{\left(\frac{5408}{900} \times \frac{10000}{3042}\right)} + \sqrt{\left(\frac{350}{3} \times \frac{7}{150}\right)}$   
 $= \frac{100\sqrt{2704}}{30\sqrt{1521}} + \frac{7}{3} = \frac{40}{9} + \frac{7}{3} = \frac{61}{9}$ ;  
 $\therefore \frac{61}{9} \div 274\frac{1}{2} = \frac{61 \times 2}{549 \times 9} = \frac{2}{81}$ . *Ans.*



time to do A's daily work denotes the *reciprocal* of A's time to do B's daily work; for it is manifest

that if A does in the time  $x$  what B does in the time 1,

A does in the time 1 (i.e.  $\frac{x}{x}$ ) what B does in the time  $\frac{1}{x}$ .

Now, the question states that A's time of doing B's daily work + B's time of doing A's is  $\frac{11}{12}$ ; that is, A's time  $\div$  its reciprocal, or

*multiplied by itself*, produces  $\frac{11}{12}$ ;  $\therefore \sqrt{\frac{11}{12}} = \sqrt{\frac{33}{36}} = \frac{1}{6} \sqrt{33}$

$= \frac{1}{6}$  of  $5.7446 = .95743$  of a day, the time A takes to do B's daily work; so that A's power is to B's as 1 to .95743; hence,  $14.2884 \text{ cub. yds.} \times .95743 = 13.6801 \text{ cub. yds.}$  *Ans.*

If  $n$  pounds denote the losing sum received for 1 pound of prime cost, then  $1 \times n \times n \times \frac{112}{100} = 1$ ;

$$n^2 = \frac{100}{112} = \frac{25}{28} = \frac{25 \times 7}{196};$$

$$n = \frac{5\sqrt{7}}{14} = .9449;$$

hence, the loss per £100 =  $(1 - .9449) \times 100 = 5.51$  per cent. *Ans.*

### Paper XIII.

1. The G. C. M. of 912 min. and 1653 min. is 57 min. *Ans.*  
In which unit of time the given quantities are represented by 16 and 29.
2.  $2.291 \div .0087 = 22910 \div 87 = 263\frac{1}{3}$ ; therefore, the subtraction can be made 263 times, and the remainder is  $= \frac{1}{3}$  of  $.0087 = .0029$ . *Ans.*
3. The G. C. M. of  $2500 - 4$  and  $3300 - 36$ , or of 2496 and 3264, is 192. *Ans.*
4. Proportion is the equality of two expressions denoting the same ratio.  
The given quantities can be formed into a proportion,  
for 2 yds. 2 ft.  $10\frac{1}{4}$  in. is  $\frac{425}{816}$  of 5 yds. 2 ft., and £12 11s.  $6\frac{3}{4}$ d. is  $\frac{12075}{23184}$  of £24 3s.; and these fractions are each equal to  $\frac{25}{48}$ .

EXAMINATION PAPERS.

$$\begin{array}{r}
 7. \quad 13 \text{ sq. ft. } 5 \text{ pr. } 7 \text{ sec.} \\
 \begin{array}{r}
 3 \quad 5 \\
 \hline
 40 \quad 4 \quad 9 \\
 5 \quad 7 \quad 3 \quad 11 \\
 \hline
 46 \text{ sq. ft. } 0' \quad 0'' \quad 11'''
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 8. \quad 29 \text{ sq. ft. } 7 \text{ pr.} \\
 \begin{array}{r}
 9 \quad 8 \quad 6 \\
 \hline
 266 \quad 3 \\
 19 \quad 8 \quad 8 \\
 1 \quad 2 \quad 9 \quad 6 \\
 \hline
 287 \text{ sq. ft. } 2' \quad 5'' \quad 6'''
 \end{array}
 \end{array}$$

9. In the result of Qu. 7, the  $11'''$  are  $\frac{11}{12}$  of  $1''$ , that is, of  $1 \text{ sq. in.}$   
 $\therefore$  the result is  $= 46 \text{ sq. ft. } 0\frac{11}{12} \text{ sq. in.}$  *Ans.*  
 In the result of Qu. 8, we have  $2' = 24''$ ; to this add  $5''$ , making  $29$   
 or  $29 \text{ sq. in.}$ ; and  $6'''$  being  $\frac{1}{2}$  of  $1''$ , the whole is  
 $= 287 \text{ sq. ft. } 29\frac{1}{2} \text{ sq. in.}$  *Ans.*

$$\begin{array}{r}
 10. \quad 26 \text{ sq. ft. } 8 \text{ pr.} \\
 \begin{array}{r}
 0 \quad 5 \quad 9 \\
 \hline
 11 \quad 1 \quad 4 \\
 1 \quad 8 \quad 0 \quad 0 \\
 \hline
 12 \quad 9 \quad 4 \quad 0
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 £0 \ 15s. \ 9\frac{1}{2}d. \\
 \begin{array}{r}
 12 \\
 \hline
 9 \ 9 \ 6 \\
 0 \ 7 \ 10\frac{1}{2} \\
 0 \ 3 \ 11\frac{1}{2} \\
 0 \ 0 \ 5\frac{1}{2} \\
 \hline
 £10 \ 1s. \ 9\frac{7}{16}d.
 \end{array}
 \end{array}$$

*Ans.*

11. If 9 *guin.* 9 *sh.* were augmented by 10 *crs.* 10*d.*, the amount would  
 be = twice the greater quantity.  
 $\therefore \frac{1}{2} (£9 \ 18s. + £2 \ 10s. \ 10d.) = £6 \ 4s. \ 5d.$  } *Ans.*  
 $£6 \ 4s. \ 5d. - £2 \ 10s. \ 10d. = £3 \ 13s. \ 7d.$

12.  $6\frac{2}{3} \text{ cwt. at } 38s. = 249\frac{2}{3}s.$   
 $24 \text{ yds. at } 8s. \ 3\frac{3}{4}d. = 199\frac{3}{4}s.$   
 Gain on  $199\frac{3}{4}s. = 49\frac{1}{4}s.$   
 Gain on  $1596 = 399$   
 $\therefore$  the gain is 1 on 4, or 25 on 100. *Ans.*

13. One man,  $\frac{1}{572} \text{ ac. per min.}$ , or  $\frac{15}{143} \text{ ac. per hr.}$   
 the other,  $\frac{1}{616} \text{ ac. per min.}$ , or  $\frac{15}{154} \text{ ac. per hr.}$   
 together,  $\frac{15(154 + 143)}{143 \times 154} = \frac{27 \times 15}{13 \times 154} = \frac{405}{2002} \text{ ac.}$  *Ans.*

14.  $\frac{2}{5}$  of  $\frac{4}{5}$  of  $\frac{7}{8} = \frac{7}{25}$ ; therefore  $1\frac{7}{25}$  of the sum  $= 40d.$   
 hence,  $40d. + 1\frac{7}{25} = 1000d. \div 32 = 2s. \ 7\frac{1}{2}d.$  *Ans.*

15. A quantity diminished by  $\cdot 037$  of itself becomes  $1 - \cdot 037$ , or  $\cdot 963$   
 of itself; therefore  $\cdot 6955 \div \cdot 963$   
 $= 695\cdot 5 \div 963 = \cdot 72.$  *Ans.*

# KEY TO COLENSO'S ARITHMETIC.

ing price 42d. a gross, is  $\frac{42d. \times 100}{144}$  a hundred;

$100 - 3\frac{1}{2} = £96\frac{1}{2}$ , the corresponding selling price of £100

th; therefore,

$$\frac{100}{144} : 30\frac{1}{2} :: 96\frac{1}{2}$$

$$42 \times 100 : 275 \times 4 :: 385 : 100\frac{5}{8}$$

which shows a gain of  $\frac{5}{8}$  per cent. *Ans.*

or  $6\frac{1}{2}d.$  is  $9\frac{3}{4}d.$  a dozen; therefore,

$$117 : 120 :: 9\frac{3}{4}d. : 10d. \quad \text{Ans.}$$

$$18\frac{1}{2} \div 5 : 37\frac{1}{2} \div 7 :: 106\frac{1}{2}$$

or  $57 \times 7 : 75 :: 532 : 100$ , which is prime cost;  
so that there is neither loss nor gain. *Ans.*

$$102.65 : 100 :: 3370 : 3283. \quad \text{Ans.}$$

$$210 \times 2 = 420 \text{ for 1 year}$$

$$155 \times 5 = 775 \text{ for 1 year}$$

$$365 \quad )1195$$

$$\frac{3100}{365} \text{ yrs.} = 3 \text{ yrs. } 100 \text{ da.} \quad \text{Ans.}$$

22.  $\frac{1}{3}$ ,  $\frac{1}{5}$ , and  $\frac{7}{15}$ , being as 5, 3, and 7; hence,

$$5 \times 4 = 20 \text{ for 1 month}$$

$$3 \times 5 = 15 \quad \text{ditto}$$

$$7 \times 7 = 49 \quad \text{ditto}$$

$$15 \quad )34$$

$$5\frac{3}{5} \text{ months.} \quad \text{Ans.}$$

$$23. \frac{\frac{1}{3} - \frac{2}{9}}{\frac{2}{3} - \frac{1}{9} \text{ of } \frac{1}{3}} = \frac{15 - 12}{185 - 180} = \frac{3}{5};$$

$$\frac{31s. 8d.}{57s.} = \frac{95}{171} = \frac{5}{9};$$

$$\frac{426.8 \text{ ft.}}{7.7 \text{ ft.}} = \frac{388}{7};$$

$$\therefore \frac{3}{5} \text{ of } \frac{5}{9} \text{ of } \frac{388}{7} \text{ of } \frac{105}{8} \text{ da.} = \frac{5}{8} \text{ da.} \times 388 = 242\frac{1}{2} \text{ da.} \quad \text{Ans.}$$

The last three factors in the given expression would form an answer to such a question as the following:—

Of one sort of goods a person sells 142 yds. 0.8 ft. per day, at £1 11s. 8d. a yard; and of another sort he sells 2 yds. 1.7 ft. per day, at £2 17s. a yard:—in how many days does he obtain for the latter sort the amount which he obtains in  $13\frac{1}{2}$  days for the former?

The answer to this will be found to assume the given form, thus:—

2 yds. 1.7 ft. per day, as compared with 142 yds. 0.8 ft. per day, to amount to a given sum, would take more days, viz. in the ratio of the former quantity to the latter, or in  $\frac{142 \text{ yds. } 0.8 \text{ ft.}}{2 \text{ yds. } 1.7 \text{ ft.}}$  of  $13\frac{1}{8}$  days.

On the other hand, £2 17s. a yard per day, as compared with £1 11s. 8d. a yard per day, would produce a given amount in fewer days, in the ratio of £2 17s. to £1 11s. 8d., or in  $\frac{£1 \text{ } 11s. \text{ } 8d.}{£2 \text{ } 17s.}$  of  $13\frac{1}{8}$  days.

Compounding, therefore, the two ratios, we shall have the answer in the proposed form; and its value will be  $404\frac{1}{8}$  days.

24. The 3rd is  $\frac{4}{3}$  of the 1st, and the 4th is  $\frac{5}{3}$  of the 1st; or, the 1st, 3rd, and 4th, are as 3, 4, 5; and the 2nd is  $\frac{3}{8}$  of the sum of these,  $\therefore$  its proportional value is  $\frac{3}{8}$  of  $12 = 4\frac{1}{2}$ , so that the four nos. are as 3,  $4\frac{1}{2}$ , 4, and 5, or as 6, 9, 8, and 10, and are, therefore, respectively, 6, 9, 8, 10, ... 33rds of 99, viz. 18, 27, 24, 30. *Ans.*

25. C gets  $\frac{3}{5}$  of B, and B  $\frac{3}{8}$  of A;  $\therefore$  C gets  $\frac{3}{5}$  of  $\frac{3}{8}$  of A; and the shares of A, B, C, are as 1,  $\frac{3}{8}$ , and  $\frac{9}{40}$ , or as 40, 15, and 9; and they, therefore, get respectively 40, 15, and 9, ... 64ths of 8s., or 5s., 1s.  $10\frac{1}{2}d.$ , and 1s.  $1\frac{1}{2}d.$  *Ans.*

26.  $\frac{10}{9} + \frac{1}{25} + \frac{1}{49} + \frac{1}{81} = \frac{110250 + 3969 + 2025 + 1225}{99225}$ ;  
 $\frac{1}{11} - \frac{3}{59} + \frac{1}{181} = \frac{10679 - 5973 + 649}{117469}$ ;  
 $\frac{117469}{99225} \times \frac{5355}{117469} = \frac{1071}{19845} = \frac{17}{315}$ . *Ans.*

27. B got 1 sum  
 C 1 such sum +  $2\frac{1}{2}d.$   
 A 1 such sum +  $3\frac{3}{4}d.$   
 $7\frac{1}{2}d. = 3$  such sums +  $6d.$   
 $\therefore 7\frac{1}{2}d. - 6d. = 3$  of B's shares;  
 $\therefore$  B got  $\frac{1}{2}d.$ ; A,  $\frac{1}{2}d. + 3\frac{3}{4}d. = 4\frac{1}{2}d.$ ; C,  $\frac{1}{2}d. + 2\frac{1}{2}d. = 3d.$   
 Hence, 20s. is to be divided into three parts, having the proportion of  $4\frac{1}{2}$ ,  $\frac{1}{2}$ , and  $2\frac{1}{2}$ , or of 17, 2, and 11; therefore the parts will be 17, 2, and 11 ... 30ths of 240d., viz. 11s. 4d., 1s. 4d., and 7s. 4d.  
*Ans.*

28. Gross half-yearly income from £100 stock = £1 $\frac{1}{2}$   
 Income-tax, 7d.  $\times$  1 $\frac{1}{2}$  =  $\frac{105}{160}$   
 Nett half-yearly income from £100 stock = £1 $\frac{73}{160}$   
 $\frac{1000}{87\frac{3}{4}}$  cents @ £1 $\frac{73}{160}$  =  $\frac{100 \times 233}{699 \times 2}$   
 = £100 + 6 = £16 13s. 4d. *Ans.*
29. 91 : 100 :: 3 $\frac{1}{2}$  : £3 16s. 11 $\frac{1}{13}$ d. per cent. *Ans.*
30.  $\frac{3}{4}$  of  $\frac{50}{63}$  of  $\frac{34}{9}$  of  $\frac{660}{13}$  of  $\frac{260}{57}$  of  $\frac{81 \times 8}{17 \times 70}$  of  $\frac{95}{8}$  of  $\frac{18655}{4840 \times 9 \times 36}$  acre,  
 =  $\frac{533 \times 625}{8316}$  ac. = 40 ac. 9 po. 10 yds. 32 $\frac{1}{2}$  in. *Ans.*
31. Interest on £100 for 4 years = £3 $\frac{1}{2}$   $\times$  4 = £14; therefore £14 is the true discount on £114;  
 £114 : £100 10s. 10d. :: £14 : £12 6s. 11 $\frac{1}{3}$ d. *Ans.*
32. Interest on £100 for  $\frac{1}{2}$  a year = £3 $\frac{1}{2}$   $\div$  2 = £1 15s.;  
 £101 15s. : £14 16s. :: £100 : £14 10s. 10 $\frac{1}{11}$ d. *Ans.*
33.  $4.027 = \frac{4027}{100} = \frac{3625}{900}$  guineas =  $\frac{145 \times 21}{36 \times 20}$  or  $\frac{29 \times 7}{12 \times 4}$  per cent.;  
 therefore the interest on £100 for 3 $\frac{3}{16}$  yrs. is  $\frac{29 \times 7 \times 90}{12 \times 4 \times 29}$   
 =  $\frac{105}{8}$  = £13 $\frac{1}{8}$ ; and therefore £100 is the present worth of £113 $\frac{1}{8}$ ;  
 £113 $\frac{1}{8}$  : £294 $\frac{1}{8}$  :: £100 : £260. *Ans.*
34.  $162.871 = \frac{162871}{100} = \frac{146584}{900}$ .  
 Also, £2.8142 =  $\frac{28142}{100} = \frac{9287}{3300}$ .  
 $\left. \begin{array}{l} \frac{146584}{900} : 100 \\ 148 : 365 \end{array} \right\} :: \frac{9287}{3300} : \frac{9287 \times 100 \times 365 \times 9}{33 \times 146584 \times 143}$   
 =  $\frac{25 \times 5 \times 3}{11 \times 8} = 42\frac{3}{88}$ . *Ans.*

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**Paper XIV.**

1. Here  $7 + .06 = 70 \div \frac{2}{3} = 105$ ; therefore  
 $\frac{36337}{840} \times \frac{20 \times 6}{29 \times 7} \times 105 = 2685$ , the less number.

Now the L. C. M. of two nos. is found by dividing their product by their G. C. M.; hence,  $\frac{2685}{537}$  of the greater no. is = 18795; or, the greater no. is =  $18795 \times \frac{537}{2685} = 18795 + 5 = 3759$ . *Ans.*

2. The least common multiple of  $6\frac{7}{8}$  and  $12\frac{5}{8}$  is that of 165 and 308 ... 24ths; and the L. C. M. of 165 and 308 being  $15 \times 308$ , we have  $\frac{15 \times 308}{24} = \frac{1}{2} (5 \times 77) = 192\frac{1}{2}$ . *Ans.*

3. 528 revs. in  $\frac{3}{4}$  of a mile is 704 revs. in a mile. Now, the diameters, or the circumferences, are as 5 to 9; therefore, the fore wheel by one-fifth of a revolution goes as far as the hind wheel does by one-ninth of a revolution;

$$\left. \begin{aligned} \therefore 704 + \frac{1}{5} \times \frac{1}{9} &= 391\frac{1}{9} \text{ revs. of hind wheel;} \\ 5280 \text{ ft.} + 704 &= 7\frac{1}{2} \text{ ft. circumf. of fore wheel;} \\ \frac{9}{5} \text{ of } 7\frac{1}{2} &= 13\frac{1}{2} \text{ ft. circumf. of hind wheel.} \end{aligned} \right\} \text{Ans.}$$

4. 10s. 6d. + 9s. 11d. =  $1\frac{1}{17}$  gal., the quantity which 1 gal. becomes by the addition of water;  $\therefore$  there must be  $\frac{1}{17}$  of a gal. of water to 1 gal. of spirits, or 1 gal. of water to 17 gals. of spirits. *Ans.*

5.  $\left(1 - \frac{8}{19}\right)$  of  $\left(1 - \frac{17}{40}\right)$  of the ore is 506 tons;  
or  $\frac{1}{19}$  of  $\frac{23}{40}$  of it = 46 tons; or  $\frac{1}{760}$  of it = 2 tons;  
 $\therefore$  the whole is 2 tons  $\times 760 = 1520$  tons. *Ans.*

6. For 48 days the int. of £100 is  $\frac{48}{365}$  of £5 =  $\frac{48}{73}$ ; and for 26 days

it is  $\frac{26}{73}$ ;

$$100\frac{48}{73} : 100 :: £225 \text{ 9s.} : £223 \text{ 19}\frac{8}{11}\text{s.}$$

$$100\frac{26}{73} : 100 :: £599 \text{ 8s.} : £597 \text{ 5}\frac{8}{11}\text{s.}$$

Joint present worth, £821 5s. *Ans.*

Int. of £821 5s. for the time sought = £824 17s. - £821 5s. = £3 $\frac{2}{3}$ ; hence,

$$\left. \begin{aligned} 5 &: 3\frac{2}{3} \\ 821\frac{1}{4} &: 100 \end{aligned} \right\} :: 365 \text{ da.} : \frac{73 \text{ da.} \times 18 \times 400}{5 \times 3285} = 32 \text{ da.} \text{ Ans.}$$

7.  $16 \text{ oz.} \times 252 \times 60 \text{ per hour} \times \frac{1728}{1000} = \text{the cub. in. issuing per hour;}$   
 $\therefore$  this divided by  $3\frac{1}{2}$  sq. in. will give the length, in inches, of the  
 volume of water issuing per hour;  
 or, dividing also by 36 in., we shall have the length in yds.; thus,  

$$\frac{16 \times 252 \times 60 \times 1728}{1000 \times 3\frac{1}{2} \times 36} = 3317.76 \text{ yds.};$$
  

$$= 1 \text{ mi. } 1557\frac{3}{4} \text{ yds. } \text{Ans.}$$

8. When corn is 15s. 9d. a quarter, and hay  $5\frac{1}{2}d.$  per stone, 126 lbs. of  
 hay with 1 bushel of corn will cost

$$\frac{5\frac{1}{2}d. \times 126}{14} + \frac{15s. \ 9d.}{8} = 49\frac{1}{2}d. + 23\frac{5}{8}d. = 73\frac{1}{8}d.;$$

but, when corn is 2s. a bushel, and hay 70s. a ton, the same quan-  
 tities will cost  $\frac{70s. \times 126}{2240} + 2s. = 71\frac{1}{4}d.$

$$\left. \begin{array}{l} 16 \text{ hor.} : 7 \text{ hor.} \\ \pounds 4\frac{1}{16} : \pounds 95 \\ 71\frac{1}{4}d. : 73\frac{1}{8}d. \end{array} \right\} :: 8 \text{ da.} : \frac{8 \text{ wks.} \times 95 \times 585}{65 \times 570}$$

$$= 12 \text{ wks. } \text{Ans.}$$

9. The proportions of lives saved are  $13\frac{1}{2}$ , 8, 62, and  $\frac{1}{2}$  in every 100  
 shipwrecked lives; and those saved by ships' boats and lifeboats  
 being respectively  $\frac{62}{100}$  and  $\frac{13\frac{1}{2}}{100}$  of the whole no. of shipwrecked  
 lives,

$$\therefore \frac{62 - 13\frac{1}{2}}{100}, \text{ or } \frac{48\frac{1}{2}}{100}, \text{ of the whole} = 2619; \therefore 1 \text{ per cent. of ditto}$$

$$= 54; \text{ and hence, multiplying 54 severally by } 13\frac{1}{2}, 8, 62, \text{ and } \frac{1}{2}$$

$$\text{we have } 729, 432, 3348, \text{ and } 27. \text{ Ans.}$$

10. Here we are to divide  $\frac{1}{15}$  into two parts having the ratio of 1 to 15;

hence, the parts will be  $\frac{1}{16}$  of  $\frac{1}{15}$ , and  $\frac{15}{16}$  of  $\frac{1}{15}$ , or  $\cdot 0625 + 15$   
 and  $\cdot 0625$ , or  $\cdot 00416$  and  $\cdot 0625. \text{ Ans.}$

11. A guinea is  $= 1\frac{2}{3}$  of what the quills cost per thousand;  
 $\therefore 21s. + 1\frac{2}{3} = 49s. \div 3 = 16s. \ 4d. \text{ Ans.}$

12.  $\frac{1}{8}$  per cent. on the amount of 1050 rings @ 22s.  $= \frac{22s. \times 1050}{800}$

$= 231 \div 8 = 28s. \ 10\frac{1}{2}d.$  for insurance;

weight of the rings  $= 28 \text{ gra.} \times 1050 = \frac{28}{7000} \text{ lb. Av.} \times 1050;$

$\therefore$  the whole weight conveyed  $= 4 \times 1.05 \text{ lb.} + 3\frac{1}{2} \text{ lb.} = 7.7 \text{ lbs.}$

2240 lbs. : 7.7 lbs.  $:: 5s. \times 144 : 2s. \ 5\frac{7}{10}d.,$  carriage  
 $\frac{28 \ 10\frac{1}{2}}{31s. \ 4\frac{1}{2}d.} \text{ insurance}$   
 $\text{Ans.}$

13. The obelisk would contain  $\frac{2}{3}$  of  $108 \times 113$  cub. ft., and weigh  
 2240 lbs.  $\times 600$ ;  
 bulk of obelisk  $= \frac{72 \times 113}{27}$  c. yds.  $= 301\frac{1}{3}$  c. yds. *Ans.*  
 Weight of a cub. foot  $= \frac{2240 \times 600}{72 \times 113} = 165.19$  lbs. *Ans.*
14. If A goes 3 units of distance in 1 unit of time, then,  
 B " 4 " " 1 " "  
 $\therefore$  A goes 1 unit of distance in  $\frac{1}{3}$  of a unit of time  
 B " 1 " "  $\frac{1}{4}$  " "  
 and  $\frac{1}{3}$  is  $\frac{4}{3}$  of  $\frac{1}{4}$ , or A's time per unit of distance is  $\frac{4}{3}$  of B's.
15. Value of A's money  $= 96s.$ ; of B's  $= 632s.$ ; together  $= 728s.$ , which  
 is to be redivided into two parts having the ratio of 6 to 1.  
 $\therefore$  after the transfer A will have  $\frac{1}{7}$  of  $728s. = 104s.$ , and so will  
 have received from B  $104 - 96 = 8s. = 4$  flor. *Ans.*
16.  $\frac{3}{7} \times \frac{19}{8} \times \frac{153}{100} : \frac{76}{13} \times \frac{17}{4} = \frac{3 \times 9}{7 \times 800} : \frac{1}{13}$   
 $= 351 : 5600$ ;  $\therefore$  the less no. is  $\frac{351}{5249}$  of the difference  $477\frac{3}{11}$ ,  
 $= 351 + 11 = 31\frac{10}{11}$ , and  $\therefore$  the greater  $= 509\frac{1}{11}$ . *Ans.*
17. The legal interest was  $= \frac{5}{100}$  of the capital,  
 the trade profit  $= \frac{9}{5}$  of  $\frac{5}{100}$  of the capital;  
 together,  $\frac{14}{5}$  of  $\frac{5}{100} = \frac{14}{100}$  of the capital;  
 $\therefore$  14 per cent. of the capital  $= £210$  14s.  
 1 do. do.  $= £15$  1s.  
 Whole capital  $= £15$  1s.  $\times 100 = £1505$ . *Ans.*
18. Amt. of £1 in 125 yrs.  $= 1.03^{125}$ ;  
 $= 1.03^{50} \times 1.03^{50} \times 1.03^{25}$ ;  
 $= 4.383906^2 \times \sqrt{4.383906}$ ;  
 $= 19.2186 \times 2.09378 = 40.2395$ , amt. of £1;  
 which  $\times 100$  will be the amount of £100;  
 $\frac{4023.95}{95}$  cents, at £3  $= £127.072$ . *Ans.*





13. Income for an investment of  $\pounds 90\frac{5}{8}$  in the 3 per cents. would be  $\pounds 3$   
and in the 4 per cents. would be  $\pounds 4 \times \frac{90\frac{5}{8}}{115} = \pounds 3\frac{7}{28}$ ;  $\therefore$  gain by the

$$\text{transfer} = \frac{3}{5} \text{ of } \pounds \frac{7}{46} = \pounds \frac{21}{230}.$$

$$\pounds \frac{21}{230} : \pounds 7 :: \pounds 90\frac{5}{8} : \pounds 725 \times 115 + 12 = \pounds 6947 \text{ } 18s. \text{ } 4d. \text{ } Ans.$$

14. If the no. of sheep be represented by 1, the oxen will be  $\frac{1}{3}$ , the

pigs  $\frac{13\frac{1}{2}}{100}$  or  $\frac{2}{15}$ , the calves  $\frac{25}{28}$  of  $\frac{2}{15} = \frac{5}{42}$ ; or the sheep, oxen,

pigs, and calves are as 210, 70, 28, and 25; and the horses are the 1000<sup>th</sup> part of the whole, or = the 999<sup>th</sup> part of the sum of all the others; therefore the proportional no. for the horses is the 999<sup>th</sup> of  $(210 + 70 + 28 + 25) = \frac{1}{3}$ ; and hence the no. of oxen and

horses together is to that of oxen as  $70\frac{1}{3} : 70$ , or 211 : 210;

$$211 : 210 :: 3587 : 3570 \text{ oxen. } Ans.$$

15. 3 @ 18s. + 4 @ 16s. + 5 @ 15s. = 193s., value of the mixture @ 15s. 6d. a gal.;  $\therefore$  the no. of gals. after the water has been added is  $386 \div 31 = 12\frac{14}{31}$ , thus showing that quantity to contain

$$12\frac{14}{31} - (3 + 4 + 5), \text{ or } \frac{14}{31} \text{ gal. water;}$$

$$12\frac{14}{31} : \frac{14}{31} :: 100 : 3.627 \text{ p. c. } Ans.$$

16. 1 man can do  $\frac{966}{15}$  c. yds. in 84 hrs., or  $\frac{23}{30}$  yd. per hour;

$$\therefore 4 \text{ men in } 7\frac{1}{2} \times 4 \text{ hrs. do } \frac{23}{30} \times 30 \times 4 = 92 \text{ yds.}$$

$$575 - 92 = 483 \text{ yds. done by the men engaged for } 7\frac{1}{2} \times 12$$

$$\text{or } 90 \text{ hrs., who therefore did } \frac{483}{90} \text{ or } \frac{161}{30} \text{ yds. per hr.;}$$

$$\text{and hence their no. must have been } \frac{161}{30} \div \frac{23}{30} = 7 \text{ men. } Ans.$$

17. I evidently give  $128 + 12$  yards for  $\pounds 100$ ;  
 $\pounds 100 \div 140 = 14s. \text{ } 3\frac{3}{4}d. \text{ } Ans.$

18. Here I sold  $32 - 3$ , or 29, quires, for the prime cost of 32, viz. for  $\frac{43\frac{1}{2}d. \times 32}{5}$ ; this divided by 29 gives  $\frac{1\frac{1}{2}d. \times 32}{5} = 9\frac{3}{8}d. \text{ per quire.}$   
Ans.

19. Here we are to divide 60s. into two parts, such that one  $\times \frac{115}{100}$  shall equal the other  $\times \frac{92}{100}$ ; or the  $1^{st} \div \frac{100}{115} = \text{the } 2^{nd} \div \frac{100}{92}$ ; the parts are therefore in the ratio of  $\frac{1}{115}$  and  $\frac{1}{92}$  or 4 and 5; hence,  $\frac{4}{9}$  and  $\frac{5}{9}$  of 60s. = 26s. 8d. and 33s. 4d. *Ans.*

20. G gets  $\frac{5}{8}$  of the gain, and  $\therefore$  F  $\frac{3}{8}$ ;

F contributes  $\frac{2}{5}$  of the stock, and  $\therefore$  G  $\frac{3}{5}$ .

Accordingly, the capitals are as 2 : 3, and the gains as 3 : 5;

$3 : 5 :: 2 \times 10\frac{1}{2} : 3 \times \text{G's time} = 35 \text{ mo.}$

$35 \div 3 = 11\frac{2}{3} \text{ mos. } \text{Ans.}$

21. At 11 o'clock, M (the minute hand) is 5 sixtieths of the circumference in advance of H (the hour hand); and we are to find at what time after 11 o'clock the interval between H and M will be 27 sixtieths. There will be two occurrences of this interval within the hour; viz. when M is 27 sixtieths and when it is 33 sixtieths in advance of H, the interval of 27 in the latter instance being on the left side of the clock.

In the 1st instance, then, M has to gain on H  $27 - 5$  or 22 sixtieths, and in the 2nd instance,  $33 - 5$  or 28 sixtieths; and as M gains on H 11 sixtieths every 12 minutes, we have

$$\begin{array}{l} 11 : 22 :: 12 \text{ min.} : 24 \text{ min. past 11} \\ 11 : 28 :: 12 \text{ min.} : 30\frac{6}{11} \text{ ditto} \end{array} \quad \left. \vphantom{\begin{array}{l} 11 : 22 \\ 11 : 28 \end{array}} \right\} \text{Ans.}$$

22.  $50s. \times 56 \times 3 = £420$ , selling price of the whole;  
 $125 : 100 :: £420 : £336$  prime cost of the whole;  
 $£336 - (112 + 120) = £104. \text{Ans.}$

23. 1st, we have to find two nos. as 5 to 1, and differing by  $62 - 30$  or 32. Here, since  $5 - 1 = 4$ , we see that the less no. is  $\frac{1}{4}$  of the difference of the nos., viz.  $\frac{1}{4}$  of  $32 = 8$ ; and 8 was the son's age  $30 - 8$  or 22 years ago. *Ans.*

2ndly, we have to find two nos. as 5 to 3, and differing by 32. Accordingly, since  $5 - 3 = 2$ , we see that the less no. is  $\frac{2}{5}$  of the difference, i.e.  $\frac{2}{5}$  of  $32 = 48$ , which will be the son's age  $48 - 30$  or 18 years hence. *Ans.*

24. When I shall be as old again as I am now, my son will have added my present age to his, and if he will then be 8 times as old as now, my present age must be seven times his; therefore, we are to find two nos. as 7 to 1 and differing by 24; accordingly, we see that since 1 is a sixth of  $7 - 1$ , the son's age must be a sixth of the difference  $24 = 4. \text{Ans.}$

25. The man rowed against the tide  $2\frac{1}{2}$  mi. in 35 min., or  $\frac{1}{14}$  mi. per min., or  $\frac{9}{14}$  mi. in 9 min., in which time he was 1 mile distant from the floating body;  $\therefore$  the tide flowed at the rate of  $1 - \frac{9}{14} = \frac{5}{14}$  mi. in 9 min., or  $\frac{5}{126}$  mi. per min.

Hence, as the man rowed against the tide  $\frac{1}{14}$  mi. per min., he would row with the tide  $\frac{1}{14} + \frac{5 \times 2}{126}$  or  $\frac{19}{126}$  mi. per min. =  $9\frac{1}{21}$  mile an hour. *Ans.*

26. Sold 26 qrs. for  $26 \times 1 \cdot 17\frac{1}{2}$  times the prime cost of 1 qr.  
and 95 qrs. for  $95 \times 1 \cdot 13$  times the prime cost of 1 qr.

If 121 quarters had been sold for  $121 \times 1 \cdot 15$  times the prime cost of 1 quarter, the amount would have been better by  $121 \times 1 \cdot 15 - (26 \times 1 \cdot 17\frac{1}{2} + 95 \times 1 \cdot 13)$  times the prime cost of 1 qr., viz. by  $139 \cdot 15 - (30 \cdot 55 + 107 \cdot 35)$  or  $1\frac{1}{4}$  of the prime cost of a qr. = 85s.  $\therefore 85s. \div 1\frac{1}{4} = 68s.$  *Ans.*

27. At 8 o'clock the minute hand M is 20 minute spaces in advance of the hour hand H, and has to gain 10 minutes more in order to be 30 minute spaces in advance; and as M gains on H 11 minute spaces in every 12, therefore,

11 : 10 :: 12 :  $10\frac{10}{11}$  min. past 8, the time indicated by the watch when the hands point in opposite directions.

Now, since a quarter to 5 o'clock M has passed over  $15 + 180 + 10\frac{10}{11} = 205\frac{10}{11}$  minute spaces, but gaining 24 sec. in every 3600 sec.; hence

3624 : 24 ::  $205\frac{10}{11}$  min. :  $1\frac{4}{11}$  min. too fast;

$\therefore$  the right time is  $10\frac{10}{11} - 1\frac{4}{11} = 9\frac{6}{11}$  min. past 8. *Ans.*

28.  $\frac{2}{7}$  of the whole cost = £400000 borrowed;

$\frac{5}{7}$  of the whole cost = £1000000 held in shares;

Now, 48 per cent. of the receipts being required for working expenses and reserve fund, the remaining 52 per cent. of the receipts consists of the dividends and the interest of the borrowed money; thus:

$4\frac{1}{2}$ p. c. on £1000000	= £45000 dividends
5 p. c. on £400000	= 20000 interest
52 p. c. of the gross receipts	= 65000
or, 1 p. c. of ditto	= 1250
or, the whole receipts	= £125000. <i>Ans.</i>

29.  $15d.$  with  $8\frac{1}{2} p. c = 16\frac{1}{2}d.$  the fair retail rate,  
 $3s. 10d. \div 3 = 15\frac{1}{3}d.$  his professed rate;  
 now, to find the price he really obtains —  
 $10 \text{ lbs.} : 10\frac{1}{2} \text{ lbs.} \} :: 15\frac{1}{3}d. : 16\frac{2}{3}d.$   
 $6860 \text{ grs.} : 7000 \text{ grs.} \} :: 15\frac{1}{3}d. : 16\frac{1}{4}d.$   
 excess per lb. beyond fair profit =  $\frac{5}{28}d.$   
 which, on  $18\frac{3}{4}$  cwt. amounts to  $\frac{5}{28}d. \times 75 \times 28$   
 $= 375d. = £1 \text{ } 11s. \text{ } 3d. \text{ } Ans.$
30.  $£1163 @ 4 p. c. \text{ for } 1 \text{ yr.} = 46.52$   
 $994 @ 4\frac{1}{2} p. c. \text{ for } 1 \text{ yr.} = 44.73$   
 $£2157 \text{ yields int. for } 1 \text{ yr.} = £91.25;$   
 but the actual int. is  $2180 - 2157 = £23;$   
 $91\frac{1}{4} : 23 :: 1 \text{ yr.} : \frac{92}{365} \text{ yr.} = 92 \text{ da. } Ans.$
31. 

	Sum borrowed	£272	6s.	6d.
1st year's int.	£13	12s.	4d.	and principal
	86	7	8	= £100
	<hr/>			
	185	18	10	
2nd year's int.	£9	5s.	11d.	and principal
	90	14	1	= £100
	<hr/>			
	95	4	9	
3rd year's int.	£4	15s.	3d.	and principal
	95	4	9	= £100
	<hr/>			

 Therefore in 3 years the whole debt is paid. *Ans.*
32. Deducting  $\frac{7}{240}$  of the gross rental leaves  $\frac{233}{240}$  of it;  
 $\therefore \frac{233}{240} \times \frac{95\frac{1}{2}}{100}$  of it = £1000;  
 $\therefore £1000 \div \frac{44503}{48000} = £1078 \text{ } 11s. \text{ } 7d. \text{ } Ans.$
33. For every £100 railway stock I got £104, which I converted to  
 $\frac{104 \times 95}{91} = £108\frac{4}{7};$  then with £105 of this I repurchased each  
 £100 of the railway stock, and had remaining a profit of £3 $\frac{4}{7}$  for  
 every £100 stock;  
 $3\frac{4}{7} : 50 :: £100 : £1400. \text{ } Ans.$
34.  $£63 \text{ } 17s. : £71 \text{ } 16s. \text{ } 7\frac{1}{2}d. :: 100 : 112\frac{1}{2};$   
 $\therefore 12\frac{1}{2} \div 2 = 6\frac{1}{4} p. c. \text{ per annum. } Ans.$   
 $£12\frac{1}{2} : £71 \text{ } 16s. \text{ } 7\frac{1}{2}d. :: £100 : £574 \text{ } 13s. \text{ } Ans.$
35. The amount of £1 by simple interest would be £1.07, and the square  
 root of 1.07 viz. 1.034408, is the amount of £1 at the compound  
 interest rate for 1 year;  
 $\therefore .034408$  is the int. of £1 for a year, or 3.4408 the rate per  
 cent. *Ans.*

36. The publishing price  $\times \frac{75}{100} \times \frac{12}{13}$ , or  $\times \frac{9}{13}$ , gives the cash price.

The publishing price  $\times \frac{71}{100}$  gives the credit price,

$$\therefore \frac{9}{13} : \frac{71}{100} :: 100 : 102\frac{5}{8};$$

so that  $2\frac{5}{8}$  is the int. of 100 for the time sought;

$$4 : 2\frac{5}{8} :: 12 \text{ mths.} : 7\frac{2}{3} \text{ mths. } \text{Ans.}$$

37.  $18 \times 10 \times 6 = 1080$  c. in. wood and sand, wt. 100 lbs.

$$17 \times 9 \times 5 = 765 \text{ c. in. sand alone, wt. 85 lbs.}$$

$$315 \text{ c. in. wood alone, wt. 15 lbs.}$$

hence, 1 cub. in. of wood weighs  $15 \div 315 = \frac{1}{21}$  lb.

1 cub. in. of sand weighs  $85 \div 765 = \frac{1}{9}$  lb.

or, the weights of equal bulks of wood and sand are as 9 : 21,  
or as 3 : 7. *Ans.*

38. Interest on £100 for 4 months = £1 $\frac{1}{3}$ ;

$$101\frac{1}{3} : 100 :: 23\frac{3}{4}s. : \frac{375}{16}s. \text{ present worth of buying price;}$$

$$100 : 106\frac{2}{3} : \frac{375}{16}s. : 25s. \text{ present worth of selling price;}$$

hence  $25s. 6d. - 25s. = 6d.$  the int. on 25s. for the time sought;  
and as it is = 2s. on 100s., or 2 per cent., the time of credit must  
be  $\frac{1}{2}$  a year. *Ans.*

39.  $102\frac{11}{12} : 100 :: £162 \text{ 12s. 2d.} : £158$ , pres. value of bill @ 7 mths.

$$111\frac{1}{6} : 100 :: £158 : £711 \div 5 = \text{pres. value of bill @ 5 mths.}$$

$$100 : 102\frac{1}{12} :: £\frac{711}{5} : £\frac{237 \times 49}{80} = \text{nett amount of goods.}$$

$$98\frac{3}{4} : 100 :: £\frac{237 \times 49}{80} : £\frac{237 \times 49}{79} = £147. \text{ Ans.}$$

40. The amount of ordinary shares  $\times 3\frac{1}{2}$  together with the amount of  
preference shares  $\times 5$  = the amount of both  $\times 4$ ;

$\therefore 5 - 3\frac{1}{2}$  times the preference stock =  $4 - 3\frac{1}{2}$  times both (*see*  
Paper XL);

or,  $1\frac{1}{2}$  of the preference stock =  $\frac{1}{2}$  of both;

or, 3 times the preference stock = the sum of both;

$$\therefore £200000 \times 3 = £600000. \text{ Ans.}$$

41.  $\frac{104}{100} + \frac{5}{100}$  of  $\frac{104}{100} + \frac{10}{100}$  of the purchase money,

or 1.192 of the purchase money = £1192;

$$\therefore 1192 + 1.192 = £1000. \text{ Ans.}$$

42. (a)  $A \times 5 = A \div \frac{1}{5}$ ;  $B \times 6 = B \div \frac{1}{6}$ ;  $C \times 7\frac{1}{2} = C + \frac{2}{15}$ ;

$\therefore$  A contains  $\frac{1}{5}$  as often as B contains  $\frac{1}{6}$ , and as often as C contains  $\frac{2}{15}$ ; that is, A, B, C, are in the proportion of these quantities.

(b) The reciprocal of a no. is the quotient of unity divided by the no.; thus the reciprocal of 3 is  $\frac{1}{3}$ , and that of  $7\frac{1}{2}$  is  $1 + 7\frac{1}{2} = \frac{2}{15}$ . Hence a fraction  $\div$  its reciprocal produces the square of the fraction:—

$$\therefore \sqrt{\frac{153}{272}} = \sqrt{\frac{9}{16}} = \frac{3}{4} \text{ Ans.}$$

43. The  $1st + \frac{1}{6} = 2nd + \frac{1}{9} = 3rd + \frac{1}{10}$ ; or the three parts are as 15, 10, and 9;

$\frac{1}{34}$  of 33 cwt. 2 qrs. 22 lbs. = cwt. 0 3 27

$$\left. \begin{array}{l} \therefore \frac{15}{34} = \text{cwt. } 14 \text{ } 3 \text{ } 13 \\ \frac{10}{34} = \text{ } 9 \text{ } 3 \text{ } 18 \\ \frac{9}{34} = \text{ } 8 \text{ } 3 \text{ } 19 \end{array} \right\} \text{Ans.}$$

44. The parts multiplied, respectively, by 4 times 3, 6 times 4, &c., or by 12, 24, 35, and 60, will be all equal; therefore the parts will be in proportion as  $\frac{1}{12}$ ,  $\frac{1}{24}$ ,  $\frac{1}{35}$ ,  $\frac{1}{60}$ , or as 70, 35, 24, and 14;

the 143rd part of £36 8s. = £0 5s.  $1\frac{1}{11}d.$ , which multiplied severally by 70, 35, &c., gives £17 16s.  $4\frac{4}{11}d.$ , £8 18s.  $2\frac{2}{11}d.$ , £6 2s.  $2\frac{2}{11}d.$ , and £3 11s.  $3\frac{3}{11}d.$  Ans.

45. The interests on £100 are £12, £15, and £5; hence the amounts are 1.12 of the 1st part, 1.15 of the 2nd, and 1.05 of the 3rd. Now 1.15 of the 2nd = 2.24 of the 1st, and .35 of the 3rd = 1.15 of the 2nd; so that the three sums are as  $\frac{1}{224}$ ,  $\frac{1}{115}$ , and  $\frac{1}{35}$ , or as

115, 224, 736.

$$\left. \begin{array}{l} 1075 : 115 :: £3010 : £322 \text{ } 0s. \\ \text{—} : 224 :: \text{—} : £627 \text{ } 4 \\ \text{—} : 736 :: \text{—} : £2060 \text{ } 18 \end{array} \right\} \text{Ans.}$$

- 46.** In the 1st instance, what cost me 105 $\frac{5}{9}$  I sell for 100;  
or, what cost me 19 I sell for 18;  
in the 2nd instance, what cost me 68 $\frac{7}{8}$  I sell for 100;  
or, what cost me 24 I sell for 35;

$$\frac{18}{19} \text{ of } £3 \text{ } 19s. \text{ } 2d. + \frac{35}{24} \text{ of } £5 = £11 \text{ } 0s. \text{ } 10d.$$

$\pounds 8\ 19s.\ 2d. : \pounds 2\ 1s.\ 8d. :: 100 : 23\frac{11}{43}\ p.\ c.\ gain.\ Ans.$

47. Time for a no. of oxen to plough the field is to time for the same no. of horses as  $90 \times 1\frac{1}{2}$  to 97; hence the whole wages for ox ploughing is  $\frac{108}{97}$  of the whole wages for horse ploughing.

Daily keep of an ox =  $\frac{7}{9}$  of that of a horse;  $\therefore$  keep of a team of

oxen while at work is  $\frac{7}{9}$  of  $\frac{108}{97}$  or  $\frac{84}{97}$  of that of horses.

Hence, 84 times the keep of horses = 97 times the keep of oxen, and 108 times the wages with horses = 97 times the wages with oxen; therefore, as the keep + the wages is the same amount in each case, we have, in the case of horse ploughing,

84 times the keep + 108 times the wages = 97 times both;  
or (108 - 84) times the wages = (97 - 84) times both (*see* Paper XI).

$\therefore$  Wages for horse ploughing =  $\frac{13}{24}$  of £7 5s. 6d. = £3 18s. 9 $\frac{3}{4}$ d. }  
Wages for ox ploughing =  $\frac{108}{97}$  of £3 18s. 9 $\frac{3}{4}$ d. = £4 7s. 9d. } *Ans.*

48. Any one of the latter party can do in  $4 \times 5$  hrs. as much as any one of the former can do in  $3\frac{1}{2} \times 6$  hrs.; hence for 28 men of the former kind we may substitute  $\frac{28 \times 20}{21} = 26\frac{2}{3}$  men of the latter kind.

Again, 24 men for  $3\frac{1}{2}$  days = 1 man for 84 da.

$$\begin{aligned} \text{minus } 2 \text{ men for } 1 \text{ day} &= 1 \text{ man for } 2 \text{ da.} \\ &= 1 \text{ man for } 82 \text{ da.} \end{aligned}$$

$$\left. \begin{array}{l} 1 \text{ m. : } 26\frac{3}{4} \text{ m.} \\ 82 \text{ da. : } 4 \text{ da.} \\ 750 \text{ yd. : } 615 \text{ yd.} \end{array} \right\} :: 6\frac{3}{4} \text{ hrs. : } \frac{27 \times 80 \times 205}{82 \times 750}$$

$= 7\frac{1}{2} \text{ hrs. a day. Ans.}$

49.  $154 + \frac{6}{7} + \frac{8}{9} + \frac{13}{5} + \frac{13}{8} = 158\frac{1817}{2520}$  men of ordinary ability ; therefore,  
the time actually taken is to that in the supposed case as  
 $158\frac{1817}{2520} : 158$ , or as  $2\frac{23}{2520} : 2$ , or as 5063 : 5040.

Hence, in the supposed case, the work would be done in  $\frac{5040}{5063}$

of the 6 da. ;  $\therefore \frac{23}{5063}$  of 6 da. =  $\frac{23}{83}$  of an hour, or 6 da. = 61 hrs.,  
or 1 da. =  $10\frac{1}{2}$  hrs. *Ans.*



50. 6 min. - 5 min. 51 sec. = 9 seconds;  
 1125 ft.  $\times$  9 travelled by the train in 6 minutes ;  
 1125  $\times$  9 : 5280  $\times$  2 :: 6 min. :  $\frac{176 \times 40}{1125}$  min. for the train to tra  
 2 miles.  
 1125 ft.  $\times$  60 travelled by sound in 1 minute ;  
 1125  $\times$  60 : 5280  $\times$  2 :: 1 min. :  $\frac{176}{1125}$  min. for sound to tra  
 2 miles.  
 $\frac{176 \times 40}{1125} - \frac{176}{1125} = \frac{176 \times 39}{1125}$  min. = 6 min. 6.08 sec. *Ans.*

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NEW-STREET SQUARE

The first of these is the fact that the  
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